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VOL. LIX.

"What invitation from every property it (the world) gives to every faculty of man! In its fruitful soils—in its navigable sea—in its mountains of metal and stone—in its forests of all woods—in its animals—in its chemical ingredients—in the powers and path of light, heat, attraction, and life, is it well worth the pith and heart of great men to subdue and enjoy it. The planters, the mechanics, the inventors, the astronomers, the builders of cities, and the captains, history delights to honour."

R. W. EMERSON.

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HOPKINS' PATENT CIRCUMPOLAR TELESCOPE ADJUSTMENT.

Fig. 3.

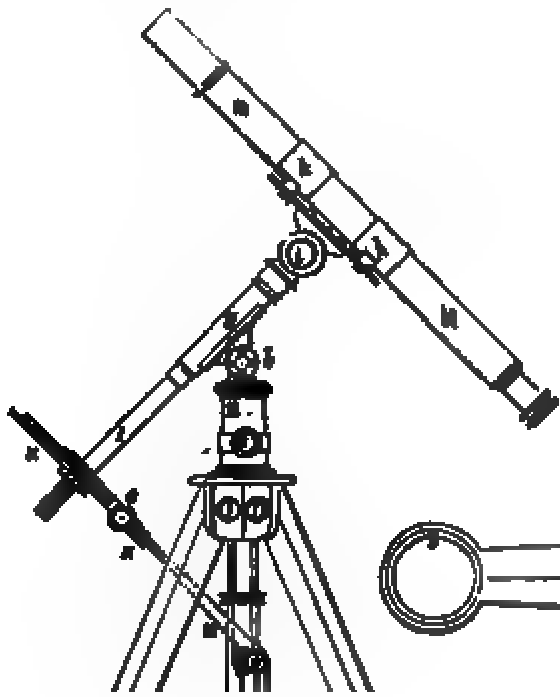
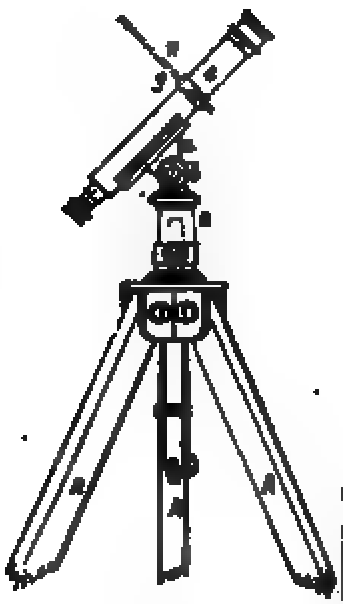


Fig. 1.



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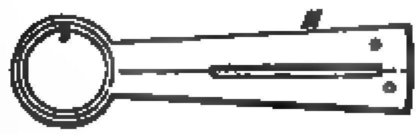
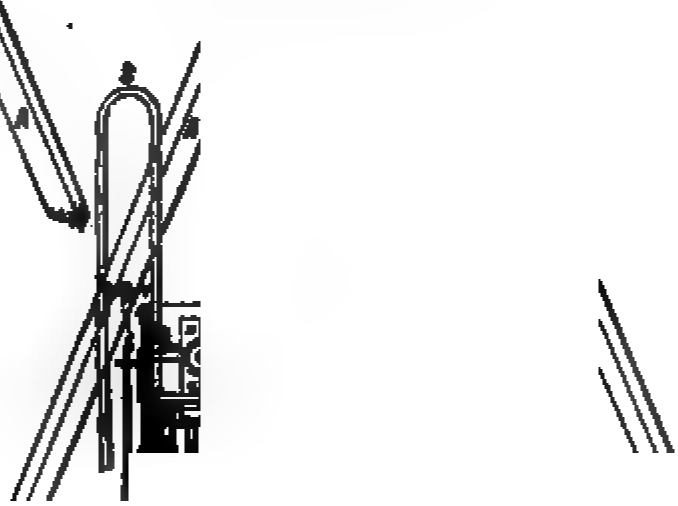




HOPKINS' PATENT CIRCUMPOLAR TELESCOPE ADJUSTMENT.

(Patent dated December 8, 1852.)

THE intention of this patent is to provide a means of obtaining a line parallel to the axis of the earth; an adjustment of extreme importance in a variety of astronomical observations, it being about this line as an axis that the fixed stars appear to describe small circles of the sphere of the heavens. Another important object which the inventor has accomplished is that of keeping a given star, or the moon, in the field of the instrument, notwithstanding its apparent motion, by giving to the latter an equal angular motion.

With regard to the first of these adjustments, the line which Mr. Hopkins obtains for a parallel to the axis of the earth may be either an extended wire, the axis of a plain tube, or of a telescope; and it may obviously be applied in the construction of sun-dials, or in the production of equatorial motion in a telescope. This parallelism is obtained by making one extremity of a line, or axis, the centre of a circle, the radius of which (the length of the line being taken as the unit) is equal to the tangent of the north polar distance of any close circumpolar star, or star revolving about the axis in the vicinity of the north pole. This line being then made perpendicular to the plane of the circle, and the eye placed at the other extremity of the line, the circumference of the circle is made to coincide with the circumference of the circle apparently described by the star, by making corresponding points in those circumferences coincident. Thus at the superior transit of the star, the highest point of the circle must be made to coincide with it, and at the inferior transit the lower. When this method is used for an astronomical telescope, (thus converting it into a polar axis, and affording an easy means of giving equatorial motion to another), its field of view must include exactly double the angle of the star's north polar distance, and the position of the axis should be tested by making the telescope revolve round its axis, when, if the star continue as it were clinging to the same point of the circumference, the axes of the earth and of the telescope will be truly parallel. In this manner the adjustment may be effected without the usual preliminary acquirements of a knowledge of the latitude and direction of the meridian, and without the preparatory aid of levels or divided circles.

The accompanying figures represent the method which the patentee adopts for giving equatorial motion to a telescope. A A, fig. 1, is a common tripod telescope-stand, upon the top of which is mounted a vertical projecting piece, or pin, shown in dotted lines, which forms the axis round which a socket, B, is free to revolve when required, in a horizontal direction. C is a brass tube attached to the socket, B, by a joint, *a*, which allows of a vertical motion being imparted to the tube, C. The tube, C, and socket, B, may be clamped in any required position by the pinching-screws, *b* and *c*, so as to render them firm when once set, and not liable to derangement. The tube, C, is made five inches in length, and has inserted into one end of it an eye-piece, in the centre of which is drilled a hole of about one-tenth of an inch in diameter; and at the other end of the tube is fixed an object-cover with a central circular aperture of about one-fourth of an inch in diameter, so that the eye of the observer being directed through the eye-piece, will take in a field of view, the circumference of which will be about equal to that of the circle, which Polaris apparently describes round the pole, and the radius of which is 1° 38′ 47″; consequently, if before fixing the position of the instrument by the pinching-screws, *b* and *c*, through the horizontal and vertical motions these circumferences be made to coincide, their centres will also be the same, and the axis of the tube will be parallel to the axis of the earth. This coincidence may be nearly enough obtained when a plain tube only is used, by viewing the Pole Star on that part of the circumference of the circular diaphragm nearest to the constellation Cassiopeia; but where greater accuracy is required, it is far preferable to use a telescope, the axis of which is made parallel to the axis of the earth, in the following manner. On the outside of the tube of the telescope are fitted two circular metal rings, *e* and *f*, fig. 1, which are carefully ground into corresponding collars in the metal-tube, C, the axis of the telescope exactly coinciding with the common axis of the collars and tube, C, and the centre of its diaphragm is made to coincide with this axial line, the diameter of the diaphragm being such as to give a field of view to the telescope of double the north polar distance of Polaris. H is a brass sector, which is separately shown in full size in fig. 2, which is capable of being moved round the upper portion of the brass tube, C, being provided with a collar, *g*. This sector is placed at right angles to the tube, and has engraved upon it an index-line. It is also provided with two small

perforations, which correspond to the relative positions of the stars, ε and ζ, Ursæ Majoris, so that when these perforations are directed to the above stars, and they are seen by the observer, the eye also taking in the field of view of the telescope, the position to which Polaris must be brought on the circumference is indicated by the index-line. In order to test the accuracy of the parallel line thus found, the telescope is turned one complete revolution in its socket; and should Polaris still continue to be seen on the same point of the circumference of the diaphragm of the telescope, it will be known that the line is correct, and that the axis of the telescope exactly corresponds in direction with the axis of the earth.

The parallel line being thus obtained, the small telescope and its sector are removed from the tube, C, and the spindle or axis, I, of a larger telescope, for astronomical observations, is inserted. This arrangement is separately represented in fig. 3, together with the apparatus which the patentee uses for giving equatorial motion to the telescope; and also, should the instrument be directed to any particular star, for enabling the observer to keep the celestial object in the field of view. Upon the end of the axis, I, is placed a double-grooved pulley, K, kept in its place by a circular nut, L, upon the screwed portion of the axis. The pulley is connected to the axis, I, by means of a feather and groove, so that when caused to revolve in the manner about to be explained, it shall impart the same rotary motion to the telescope, M. The telescope, M, is attached to the axis, I, by the circular clamps, *h h*, and joint, *l*, which admits of vertical motion being given to it. The upper groove of the pulley, K, is made exactly 24 inches in circumference, while that of the lower groove is nearly equal to 25 inches—the former bearing to the latter the proportion of the sidereal to the mean lunar day. In making a sidereal observation, the cord, N, is passed over the upper groove, as indicated in the figure, and is kept in its place by the clamp, O. One end of the cord, N, is attached to a weight, P, which is sunk into the centre of a circular tray, Q, which floats upon water placed in the receiver, R. S is a glass syphon attached to one side of the floating trough, one leg of which dips into the water in the reservoir; and the bore of the syphon is made of such a size that with the rack and pinion adjustment it may run the water off at a speed which shall exactly correspond with the required speed of the revolution of the pulleys, so as to adapt the revolution of the telescope to the motion of the star. T is a small weight attached to the other end of the cord, to give to it the requisite degree of tension. The leg, S′, of the syphon is passed through collars, *m m*, attached to a rack, V, which can be raised or lowered by means of a pinion on the spindle of the thumb-screw, *n*, so as to adjust the length of the syphon to run the water off, at the rate of a gallon in one mean solar hour. W is a cock which is placed at the bottom of the reservoir, R, and is capable of being turned by means of the rod, X, terminating in the milled head, Y, so as to open the outflow of the water, should the star be at all in advance of the telescope, which usually happens at the commencement of the observation. The circular tray, Q, is thus caused to fall more rapidly, and a greater speed is imparted to the revolution of the telescope, until the object coincides with the centre or axial line of the telescope, when the extra flow of water is stopped by shutting off the cock, W, and it is caused to flow through the syphon only; or should it be desired to follow the motion of the moon, the cord must be removed to the lower groove of the pulley, K, which represents the right ascension circle.

THE TRADES OF BIRMINGHAM.

Messrs. John and Edwin Wright have erected some machines for making ropes. These machines are driven by steam, and are calculated to run either upon the earth or upon a line of rails, and may be used in making any sized rope from the smallest ratline to the heaviest and thickest cable. Some idea of the saving of time and labour may be formed from the fact that a large cable, the construction of which by the ordinary method would occupy from twelve to fifteen men more than one day, may now be completed in about two hours with the assistance of one man. The machines have been constructed by Mr. G. Fowler, of London, who some time ago, it may be remembered, was presented by the Emperor of Russia with a gold repeater, for his improvements in ropemaking.

No further alteration has been announced during the present week in the price of copper. Looking at the present state of our relations with Russia, from which country we are accustomed to receive large supplies, this is somewhat remarkable. There is at the present moment an immense quantity of scrap in the metal-market, and this, no doubt, has had a considerable effect in checking an advance. One of our largest manufacturers in Birmingham gave it as his opinion this week that copper before long would be down at £100 per ton;

and that in all probability it would remain steady at that price.

The cut nail business is something better than for some weeks past. There has been within the last few days a greater demand, one maker alone having cleared out of stock not less than 50 tons. The wrought nail trade is not so active, and prices are lower.

The lamp trade is becoming busy for exportation, and there are considerable orders in hand for the Mediterranean. Such is the lead obtained by the new French lamp, the "Moderator," that we understand that several of our Birmingham makers have commenced, or are about to commence, the manufacture. There is at the present time a considerable demand for agricultural implements used in the hay and corn harvests. Messrs. Mapplebeck and Lowe, Mr. Samuelson of Banbury, Messrs. Ryland and Proctor, and the other manufacturers of the district are extremely busy at their manufacture, and also in preparing articles for exhibition at the Royal Agricultural Show, at Gloucester, in July.

Within the last few days the Submarine Telegraph Company have laid their wires through this town, and in a short time the communication with London and the Continent will be completed. Offices have been opened in the centre of the town, under the management of Mr. C. Tottenham, and there is no doubt the extension of the telegraph to Birmingham will be found of great service to the inhabitants of the town and district.

The columns of our local papers still present a very gratifying appearance. Workmen in almost every branch are required. The following are, perhaps, the most prominent trades in which good workmen may find employment,—metal smiths, German silver spoonworkers, wiredrawers, gunfinishers, jewellers, brassfounders, joiners, &c., and from the number of orders now in hand there is little doubt our summer trade will far exceeed that of past years. Additional activity will probably be caused by the arrival of fresh orders from Australia, which are every day expected by the *Melbourne*, now over due. The recent arrivals from North America have brought over more than an average amount of orders for hardware of all kinds, and the South American trade has been equally brisk. The demand for fancy articles for the latter market has been unusually large, and the same will apply to the Spanish trade. Some of the large houses in this town have rather increased the number of travellers for Spain, and, I am given to understand, with satisfactory results as to our general miscellaneous trade. The metal-market has not undergone any alteration since our last report.

THE IRON TRADE.

The demand for wrought iron is greater than could have been expected, considering the enormous quantity already made. Rails, sheets, and boiler-plates are in requisition for the Continent, to complete large undertakings, the completion of which has been held back some months in anticipation of a reduction, which, it is feared, the present high price of coal, rate of wages, and future prospects, will not permit of. The trade in bars and rods is not so profitable as heretofore, but this is to be attributed to the unreasonable powers of production which have been set in motion. The pig-market is not quite so satisfactory as could be desired, still the demand is considerable, and prices tolerably well maintained. In a few days, however, a general report of the real state of the trade will issue from the forthcoming meeting, and all those interested in this important branch of industry will be better able to regulate their transactions.

South Wales.—A very general advance in the rate of wages paid to the men at the various iron-works has just taken place. At Dowlais, the extensive works of Sir John Guest, an advance of 10 per cent. has been promised, and at the Maestig Iron-works an advance of 5 per cent. has taken place. At Treforest, likewise, much joy has been caused by an announcement on the part of Mr. Crawshay that a rise of 2s., and in some cases 3s., in the pound would be made immediately. These have been voluntary acts on the part of the masters. The great strike of the men lately employed at the Llynfi-valley works still continues, and there is no prospect of an amicable adjustment. Large meetings of the men have been held, when the proceedings have been most peaceably conducted. Vast numbers of these men are now leaving the place in order to seek employment elsewhere, and soon it is expected that the whole body, numbering 3,000, with their families, will have left. Public sympathy is very much in favour of the men. Fifty colliers and their families have left Pontypridd for Australia, having been engaged to work there.

America.—By the Royal Mail steamship *Arabia*, which brought advices to Liverpool on Saturday last, dating from New York to the 15th ult., it appeared that 150 tons of Scotch pig-iron realized 28 dollars cash, and 30 dollars six months.

M. Claudet, the well-known daguerreotypist, whose valuable essay on the stereoscope lately procured for him the medal of the Society of Arts, presented to him by his Royal Highness Prince Albert, has been elected a Fellow of the Royal Society.

PATENTS UNDER THE NEW LAW.

The extraordinary rapidity with which patents have accumulated under the favourable operation of the new law, has rendered it impossible for us to carry out with respect to them our usual practice of giving an abstract of every specification enrolled. Of the difficulty of keeping pace with the enormous amount of patented inventions which have been launched upon the world since the month of October last, some idea will be formed when it is stated that the number filed has, in some instances, exceeded 250 in one week. In the first few months of the new law, this large amount of business may be accounted for on the supposition that great numbers of patents were kept in reserve until it had passed. The average at present is about 50 a week, and though this is about five times larger than the average under the old law, we propose henceforth to describe them regularly in the *Mechanics' Magazine* as they are filed. With regard to those which we have been reluctantly obliged to pass by, upon any of our correspondents referring us particularly to any one of them, we shall furnish a substantial account of it in the next number of the Magazine.

Singular Occurrence in a Mine.—After the firing of a blast at Wheal Squire Mine, one of the miners, too anxious about the result, descended before the powder smoke had properly cleared away. He consequently imbibed the impure air, and, although immediately drawn up by his companions, did not succeed in landing, but fell from the "kibble" the depth of 14 or 15 fathoms. The anxiety of his comrades for his safety led one to descend; but he, finding himself unable to live, called to "wind up," which was done before he had properly placed himself in the "kibble;" he, however, held on with both hands, but fell before he was able to land. The greatest consternation prevailed among the miners, no one daring to venture into such an impure atmosphere, where they believed two of their comrades to lie dead. Fortunately, the captain of the mine, Mr. R. Penberthy, had read that, under similar circumstances, a life had been saved by throwing water down the shaft, and after doing so for some time, they had the pleasure of knowing, by the feeble groans of their comrades, that life was not extinct; and, although severely cut and bruised from the effects of the fall, there is every hope they will be restored to their families. One of the men states that he was conscious he was dying, but was unable to speak till the descent of the water purified the air, and caused a chill to pass over his body. The other, on being brought to the surface, was apparently lifeless, and there is no doubt, that in a very short time they would have been beyond all human aid.—*Cornwall Gazette.*

LAUNCH OF THE "PRINCESS ROYAL."

Another valuable addition to the fleet was made on the 23rd inst., by the launch of a screw two-decker, the *Princess Royal*, of 91 guns, at Portsmouth. This vessel was laid down in 1841 on the plan of the *Albion* of 90 guns, which was designed by Captain Sir William Symonds, the late surveyor of the navy. The following were her original dimensions as a sailing ship:

	Ft.	In.
Length on the gun deck	204	
Extreme breadth	59	6
Depth in hold	28	8

The *Albion* having been found a most uneasy ship from the excess and quickness of her rolling motion, it was deemed necessary to alter the form of those ships which were in the course of building on the same lines. With a view to determine precisely what the alterations should be, the Admiralty proposed the question to the newly-established committee of reference on naval architecture, and the result of their deliberations was a diminution of two feet in the breadth of this ship, and some slight alteration in the form of her sections. In 1847, when this was determined on, the ship was fully in frame, with the planking on. In order, therefore, to carry out the recommendation of the above-named committee, it was absolutely necessary to unbuild the ship, and take her entirely to pieces! The expenses attending this freak of the naval cooks were upwards of £9,000. There can, however, be no doubt of its necessity, as every exposure of the *Albion* to heavy weather has shown, in a very palpable manner, the faultiness of her form; and only a few months ago, in a gale of wind in the Mediterranean, it is reported that her rolling was such, that the seamen were unable to remain at their duty on the yards. The Admiralty have recently seen the necessity of supplying auxiliary steam power and a screw propeller to some of the line-of-battle ships nearly ready to be launched. The *Princess Royal* was selected as one to undergo the change, and, consequently, a

further alteration was made by lengthening her 13 feet by the stern. She is now, therefore, of the following dimensions:

	Ft.	In.
Length from figure-head to tafrail	252	
Length between the perpendiculars	217	
Length of the keel for tonnage..	179	3½
Breadth extreme	58	1½
Breadth for tonnage	57	3½
Breadth moulded...............	56	5½
Depth in hold	24	
Burden in tons (old measurement)	3,129	90-24
Ditto (new)..........	1,483	

The preparations for the launch were of a stupendous character. Booths were erected for 5,000 persons, beside whom there could not have been fewer than 30,000 spectators afloat and ashore to witness the spectacle. The arrangements of the dockyard authorities were very complete.

Precisely at half-past twelve o'clock—the time appointed—the master shipwright, Mr. Abethel, conducted the wife of Captain Edward Fanshawe, R.N., to the bows of the vessel, and that lady, in the usual manner, named her the *Princess Royal*, immediately after which ceremony the dogshores were knocked away, and the noble fabric glided easily into the water amid the shouts of the multitude and the notes of "Rule Britannia," "God save the Queen," &c., by the dockyard battalion band.

The following is to be the *Princess Royal's* armament:

	No. of Guns.	Calibre.	Weight.	Length.
Lower deck	20	... 8-inch	... 65 cwt. ...	9ft. 6in.
	12	...32 prs.	... 56 cwt. ...	9ft. 6in.
Main deck...	8	... 8-inch	... 65 cwt. ...	9ft.
	26	...32 prs.	... 56 cwt. ...	9ft. 6in.
Upper deck	24	...32 prs.	... 42 cwt. ...	8ft.
Forecastle...	1	...68 pr.	... 95 cwt. ...	10ft.
	91			

Launch of the "Northfleet."—On Saturday a fine ship of 900 tons register was launched at the dockyard of Mr. Pitcher, Northfleet, and was christened the *Northfleet*, in compliment to the place of her construction. She was built for the Messrs. Dent, of London, for the East India trade. In this dockyard several steamers of the first class have been built within the last ten years for the West India Steam-packet Company, and there are now on the stocks in the yard two steamers of still larger dimensions for the same company. There was a great concourse of people collected in the yard and on the adjoining heights to witness the launch of the *Northfleet*, which was perfect in its way.

TRIAL OF THE BOOMERANG SCREW PROPELLER.

On Saturday last at half-past seven, A.M., a trial trip with Sir Thomas Mitchell's boomerang propeller took place in Stoke's Bay, along the measured mile, on board Her Majesty's ship *Conflict*, under the command of Captain Henderson, C.B., of Her Majesty's ship *Blenheim*.

The wind was strong at the time the *Conflict* reached her trying-ground, amounting to from six to seven, or equal to about a quarter of a knot. The tide was opposed in one direction of the course, the wind in the other. After eight runs along the measured distance, the results were, on an average, 9·125 knots, with an average of 63¾ revolutions This was somewhat surpassing in speed the result of the last trial with the common screw, with 8 revolutions less, and a saving of one-eighth of the coal; and Sir Thomas Mitchell appeared to entertain no doubt that, had the pitch of the boomerang screw been the same as the pitch of the common screw, a higher speed would have been the result. The reduction of the vibration ordinarily experienced on board either screw or paddle-steamers, and frequently a distressing annoyance, was noticed approvingly by all on board the *Conflict*. This comparative absence of vibration is one of the best characteristics of the boomerang, saving at once the wear and tear of the ship and the passengers' rest. The *Conflict*, however, is not a vessel the construction of which admits of her rapid propulsion either by steam or canvas, as her trials in Commodore Martin's squadron, as set fourth in the official report, sufficiently testify. This heaviness of the *Conflict* clearly accounts for the less brilliant result as to speed obtained with the boomerang than was formerly obtained with it at Liverpool and Sydney, on board vessels built on lines better adapted for speed. We were informed by one of the owners of the *Genova* (a Liverpool merchant ship, of which we noticed the trial with this propeller), that on a recent voyage home from Quebec to Liverpool the *Genova* had averaged a knot more per hour with the boomerang propeller than he had ever previously attained with a common screw, with not half the customary vibration.

The name "Boomerang" propeller has incited many inquiries as to what affinity, in nature as in name, this screw of the scientific Australian engineer and discoverer, Sir Thomas Mitchell, claims with the familiar though little understood missile of that name, of which such marvellous stories are told. In the hands of a native the boomerang certainly performs marvellous feats,

while in those of a European it is inert or intractable. The savage, by practice, knows precisely how to poise as well as project his familiar missile, and in this secret, we apprehend, consists Sir Thomas Mitchell's application of the principle of the Australian missile to the propulsion of vessels. The balanced centre is the great feature connecting Sir Thomas Mitchell's screw and the boomerang, and upon this principle, judging by analogy, the efficiency of the arrangement very much depends. Other trials with Sir Thomas Mitchell's propeller are in contemplation, when we shall further notice the results obtained.

PARRATT'S LIFE-BOAT RAFT.

On Thursday week some experiments were tried at the landing-place in Woolwich Dock-yard with Mr. Parratt's life-boat raft. The invention is very simple, and might be always available on board ship if the hammocks of the crew were made water-tight, and so constructed as to be capable of being inflated in the manner of an air-bed. The boat experimented with by Mr. Parratt was 27 feet long by about 6 feet breadth of beam, 3 feet 4 inches in depth, and drawing one foot of water. On the outside of the boat four hammock-shaped India-rubber air-tight cases were lashed, two on each side, and when inflated they gave the boat three times its own natural buoyancy, rendering it capable of carrying 50 men, who were rowed by four oars and four paddles, making it a safe life-boat, not liable to be upset. On approaching a wreck, the two air-tight cases are extended by a cross-beam to the distance of 6 feet from each side, making in all a breadth of 18 feet, the space from the boat to the cases being covered with strong netting, so that any person may jump down upon it, from a height of 20 feet without being hurt, or being able to upset the boat. Sixty-one men were at one time on the raft without having much effect on its immersion, and the experiments exhibited the great advantage which troop-ships, passenger steam vessels, and emigrant ships would possess, in cases of danger from fire or shipwreck, if provided with the means of adapting this invention to every boat on board; and if the rafts were expanded before being thrown overboard, there would be no danger of its capsizing were the boat even to fill with water. In a heavy sea it would still have sufficient buoyancy with 50 persons on board, to have its gunwale 11 inches above the water line. The boats usually carried by steam-vessels, if fitted on Mr. Parratt's plan, would hold 100 persons, and convey them safely to the nearest shore.

Lunar Rainbow.—This rare and singular phenomenon was witnessed at Bedminster, near Bristol, on Sunday night last, at a quarter before 11. The moon being full on Tuesday morning, the rainbow was not circular. It occupied a space on the horizon from W.N.W., terminating N.E. by E., about 140 degrees, and at its highest part about 38 degrees above the horizon. It lasted nearly half an hour, and was of no direct colour, but very distinct in its arc.

THE PANOPTICON, LEICESTER-SQUARE.

This fine Institution is rapidly progressing towards its completion, and gives increasing promise of its great value as a place of popular illustration in the arts and sciences. One department, that of photography, is now in a far advanced state, and when completed will embrace many objects of the greatest importance in the cultivation and practice of that elegant and very popular process. Mr. Marmaduke Clark, the manager of the Institution, has devoted his attention to the subject with a view of rendering it easier of aquisition to the amateur, who will please himself, and at the same time help to accumulate pictures of celebrated scenery and works of art, and also to others to whom it would give all the advantage of possessing an art, as the foundation of an honourable profession. The plan upon which Mr. Clark has proceeded, is admirably adapted for this purpose. Small chambers have been constructed in the portion of the building devoted to photography, and fitted up as studios for the amateur, who, for a small charge, may take his apparatus there and experiment with it at his leisure. If he have none, the Institution will, also, at a small cost, allow him the use of the best apparatus, and furnish him with an ample stock of all the chemicals necessary. Should he desire to have the advantage of a professor, there will be a class formed in the department which he may join, at a small additional outlay. Thus for a few pounds a young man may easily qualify himself for the successful practice of a highly interesting and elegant art, which enabling him to take portraits, or landscapes, may prove highly valuable to him.

In connection with the photographic department of the Panopticon, we may notice a new arrangement of the stereoscope which

has been brought out here, and which constitutes a decided improvement upon the common form of that instrument. It consists, first, in mounting it upon a heavy brass stand, which, having a telescopic stem, admits of the instrument being raised to any convenient height above the table, and in that position it may be retained by a few turns of a screw which tightens a small strap at the top of the lower portion of the instrument. The connection between the box of the stereoscope and the stand is effected by a strong hinge, having just sufficient friction to enable the operator easily to incline the instrument at any angle he pleases, and to make it rest steadily in that position without the aid of any other adjustment. Having brought it into the best position to admit the light, there is a platform of the size of the bottom of the instrument, which is hinged to the lower edge of the box next the operator, which must now be moved into its proper position. For this purpose, a silk cord is attached to one side of the platform near its remote edge, and this is passed over a small pulley on the box, and supports a counterpoise. The operator places a white card, or one of tinted paper, upon the platform, when in the best position for turning the light upwards through the instrument, which is readily obtained, and then he introduces the transparent slide containing the binocular perspectives. The effect of this combination is singularly good. A warmth and tone are imparted to the several surfaces comprised in the picture, which immeasurably heightens the power of the stereoscope. Several subjects were handed to us, which we submitted to the operation of this form of the instrument, and in every instance the result obtained was most effective. A view of Paris, embracing in the field of view a large extent of that city, struck us in particular as being remarkably perfect in the realisation of nature, and conveyed an infinitely better idea of the subject than the first representation of it, merely pictorial, could by any possibility afford. Among other portions of it was a large quadrangular court, included between lofty houses. The perspective embracing the upper portion of the court, the idea of depth was suggested with irresistible force, and the distribution of the masses of light and shade, with all their gradations, appeared more impressive than is the case where the operator is not so much at liberty to procure for his experiment the most favourable conditions.

The Panopticon stereoscope also comprises a sliding motion for both the sights, thereby rendering it available for every range of vision; and by the addition of a slight spring catch, the slide is retained in its place, and protected from accident.

A very useful and clever application of the instrument has recently been made. It appears that large houses manufacturing solid objects of design in the fine arts, have hitherto furnished their travellers with specimens of their recent productions, which are carried from place to place by their travellers, and are commonly given away to large customers. Instead of doing so in future, the object will be sent to the photographer, who will prepare by the camera the two perspectives for the best view of it, and a number of copies will be returned with the object to the manufacturer at a small cost. The traveller will take these with him, and a stereoscope, and with his samples thus reduced into small space he will on any occasion be able to convey to the customer an adequate idea of the object represented. In a little time, probably, the stereoscope may be dispensed with by the traveller; for if the customers provide themselves with them, it will be only necessary to send the perspective by post, and they can realise the object for themselves.

It is difficult at present to foresee the number of useful applications of which the stereoscope is susceptible. Though now only in the very infancy of its use, it has answered a variety of useful purposes, and none more useful than the powerful incentive which it has given to the cultivation of the beautiful art of photography. The facilities afforded at this Institution for the combined study of photography, and of the aid which the stereoscope can furnish in the superposition of photographic projections, becomes doubly important from this consideration, and reflects great credit on the judgment and enterprise of the manager.

The large electrifying-machine, the plate of which is 10 feet in diameter, and has been cast by the Thames Plate Glass Company, will soon be ready. It will be carried on a large and beautiful iron frame-work, and driven by steam power; so that a brilliant series of experiments in electricity and its associated sciences may be anticipated. Mr. Whitworth has sent in £6,000 worth of lathe and other machinery, which will be turned to account for the best purposes of practical instruction in the art of the engineer.

LAUNCH OF THE "CRŒSUS."

On Tuesday week the launch of a stupendous ship, took place in Orchard Yard, Blackwall, belonging to Messrs. Mare, the builders of the vessel. It was originally intended that the ship should be called the *Jason*, but circumstances occurred to induce

the proprietors to alter their determination, and she will hereafter be known as the *Crœsus*. The vessel is an iron-built screw frigate, belonging to the General Screw Shipping Company, and is the sister-ship of the *Calcutta* and the *Queen of the South*; in fact, the company has about six vessels of similar dimensions, which are as follow:—Length between the perpendiculars, 280 feet; length of the keel for tonnage 254 feet 2¾ inches; breadth for tonnage 43 feet; depth in hold 31 feet 6 inches; burthen in tons 2,500; 400 horse power. Considering the dulness of the weather, and the copious showers of rain which fell during the morning, few people assembled compared with the vast numbers who congregated to witness the launch of the *Himalaya*, which took place a few weeks since in the adjoining dock. Shortly after one o'clock, all the arrangements having been made, a signal was given that the launch should be proceeded with, and in a few moments afterwards the dog-shores were removed, and the vessel glided away in rapid and majestic style, the band of the 2nd Life Guards, who were stationed on the platform, playing the National Anthem. By means of strong warps secured to the stern of the vessel from the shore, the ship was brought up before she had gone twice her length into the water. Immediately afterwards she was taken in tow by two steamers, conveyed out of the creek, and moored off the East India Dock entrance, where her fine proportions were seen to very great advantage, her hull towering above all the vessels on the river.

PROFESSOR FARADAY ON TABLE-TURNING.

We extract from a letter addressed by Mr. Faraday to the Editor of the *Times*, the following account of the researches instituted by that distinguished philosopher on the subject of table-turning, from which it will be perceived that he repudiates the phenomena altogether:

"Believing that the first cause assigned—namely, a *quasi* involuntary muscular action (for the effect is with many subject to the wish or will)—was the true cause, the first point was to prevent the mind of the turner having an undue influence over the effects produced in relation to the nature of the substances employed. A bundle of plates, consisting of sandpaper, millboard, glue, glass, plastic clay, tinfoil, cardboard, gutta-percha, vulcanized caoutchouc, wood, and resinous cement, was therefore made up and tied together, and being placed on a table, under the hand of a turner, did not prevent the transmission of the power; the table turned or moved exactly as if the bundle had been away, to the full satisfaction of all present. The experiment was repeated, with various substances and persons, and at various times, with constant success; and henceforth no objection could be taken to the use of these substances in the construction of apparatus. The next point was to determine the place and source of motion,—that is, whether the table moved the hand, or the hand moved the table; and for this purpose indicators were constructed. One of these consisted of a light lever, having its fulcrum on the table, its short arm attached to a pin fixed on a cardboard, which could slip on the surface of the table, and its long arm projecting as an index of motion. It is evident that if the experimenter willed the table to move towards the left, and it did so move before the hands, placed at the time on the cardboard, then the index would move to the left also, the fulcrum going with the table. If the hand involuntarily moved towards the left without the table, the index would go towards the right; and, if neither table nor hands moved, the index would itself remain immoveable. The result was, that when the parties saw the index it remained very steady; when it was hidden from them, or they looked away from it, it wavered about, though they believed that they always pressed directly downwards; and, when the table did not move, there was still a resultant of hand force in the direction in which it was wished the table should move, which, however, was exercised quite unwittingly by the party operating. This resultant it is which, in the course of the waiting time, while the fingers and hands become stiff, numb, and insensible by continued pressure, grows up to an amount sufficient to move the table or the substances pressed upon. But the most valuable effect of this test-apparatus (which was afterwards made more perfect and independent of the table), is the corrective power it possesses over the mind of the table-turner. As soon as the index is placed before the most earnest, and they perceive,—as in my presence they have always done—that it tells truly whether they are pressing downwards only or obliquely, then all effects of table-turning cease, even though the parties persevere, earnestly desiring motion, till they become weary and worn out. No prompting or checking of the hands are needed—*the power is gone;* and this only because the parties are made conscious of what they are really doing mechanically, and so are unable unwittingly to deceive themselves. I know that some may say that it is the cardboard next the

fingers which moves first, and that *it* both drags the table and also the table-turner with it. All I have to reply is, that the cardboard may in practice be reduced to a thin sheet of paper weighing only a few grains, or to a piece of goldbeater's skin, or even the end of the lever, and (in principle) to the very cuticle of the fingers itself. Then the results that follow are too absurd to be admitted: the table becomes an incumbrance, and a person holding out the fingers in the air, either naked or tipped with goldbeaters' skin or cardboard, ought to be drawn about the room, &c.; but I refrain from considering imaginary yet consequent results which have nothing philosophical or real in them. I have been happy thus far in meeting with the most honourable and candid though most sanguine persons, and I believe the mental check which I propose will be available in the hands of all who desire truly to investigate the philosophy of the subject, and, being content to resign expectation, wish only to be led by the facts and the truth of Nature. As I am unable, even at present, to answer all the letters that come to me regarding this matter, perhaps you will allow me to prevent any increase by saying that my apparatus may be seen at the shop of the philosophical instrument-maker—Newman, 122, Regent-street.

"Permit me to say, before concluding, that I have been greatly startled by the revelation which this purely physical subject has made of the condition of the public mind. No doubt there are many persons who have formed a right judgment, or used a cautious reserve, for I know several such, and public communications have shown it to be so; but their number is almost as nothing to the great body who have believed and borne testimony, as I think, in the cause of error. I do not here refer to the distinction of those who agree with me and those who differ. By the great body, I mean such as reject all consideration of the equality of cause and effect, who refer the results to electricity and magnetism—yet know nothing of the laws of these forces; or to attraction—yet show no phenomena of pure attractive power; or to the rotation of the earth, as if the earth revolved round the leg of a table; or to some unrecognized physical force, without inquiring whether the known forces are not sufficient; or who even refer them to diabolical or supernatural agency, rather than suspend their judgment, or acknowledge to themselves that they are not learned enough in these matters to decide on the nature of the action. I think the system of education that could leave the mental condition of the public body in the state in which this subject has found it, must have been greatly deficient in some very important principle."

BAGGS' PATENT GOLD AND SILVER ORE AMALGAMATOR AND SEPARATOR.

(Patent dated December 14, 1852.)

By the arrangement patented by Mr. Baggs, the process of extracting gold and silver from their ores by amalgamation with mercury is rendered more expeditious and effective. The process adopted by him consists in arranging sieves, or other surfaces covered with mercury, in the interior of an appropriate vessel, or amalgamator, which contains the gold or silver ore, mixed with water, and a certain quantity of loose mercury. This expedient greatly increases the active surface of chemical attraction, and an amalgam is produced in a much shorter time than under ordinary circumstances. The specification also describes a method of separating the auriferous or argentiferous amalgam from the refuse material with which it is associated, by taking advantage of the effect of the chemical attraction exerted by the mercurialized surfaces, and the action of gravity of the amalgam itself. Fig. 1 is a side elevation of the amalgamator, combined with an arrangement for carrying out the separating process. Fig. 2 is a cross section of the amalgamator, and fig. 3 a vertical section of the separator. A is a framing of wood or metal, in which the amalgamator, B, is mounted. C is the shaft or axis on which the amalgamator, B, revolves. This shaft is supported in the end-bearings, *c c*, in the framing, A, and is provided at one end with a winch-handle for working by hand, and at the other end with a strap-pulley, D, for driving the amalgamator by power, as may be preferred. E are sieves, composed of copper wire or perforated plates of copper, arranged radially in sets of two, three, or more, within the amalgamator, B. The sets of sieves are mounted in frames, F F, which are made of such a size as to enable them to be readily introduced or removed through the end, *b*, of the amalgamator, and the frames, F F, are supported within the amalgamator by the grooved frame, G, mounted on the shaft, C, and by blocks, G^1 G^1. These blocks occupy the spaces left between the straight sides of the frames, F F, and the curved interior of the amalgamator, and serve also to direct the mixed matters passing through one set of sieves to the next set in succession. The end, *b*, of the amalgamator is formed in two

parts, which are made to take off to allow of the removal and introduction of the sets of sieves, E E, and are held firm when the apparatus is at work by means of a bar, H, the ends of which pass through holes in the straps, *h h*. The bar has an oblong slot at the middle of its length, to enable it to be moved endwise, and is provided with pinching-screws, the points of which bear against the movable end, *b*, and press it firmly into place. I I are stay-screws for supporting the barrel, B, on its shaft, when the sieves, E E, are withdrawn. J is an aperture in the side of the barrel, B, covered by the slide, K, through which the matters to be treated are introduced, and the resulting amalgam and refuse withdrawn. The sieves, E E, are mercurialized by immersing them in a solution of the nitrate of mercury. The patentee recommends that the sieves should be composed of copper.

Fig. 1.

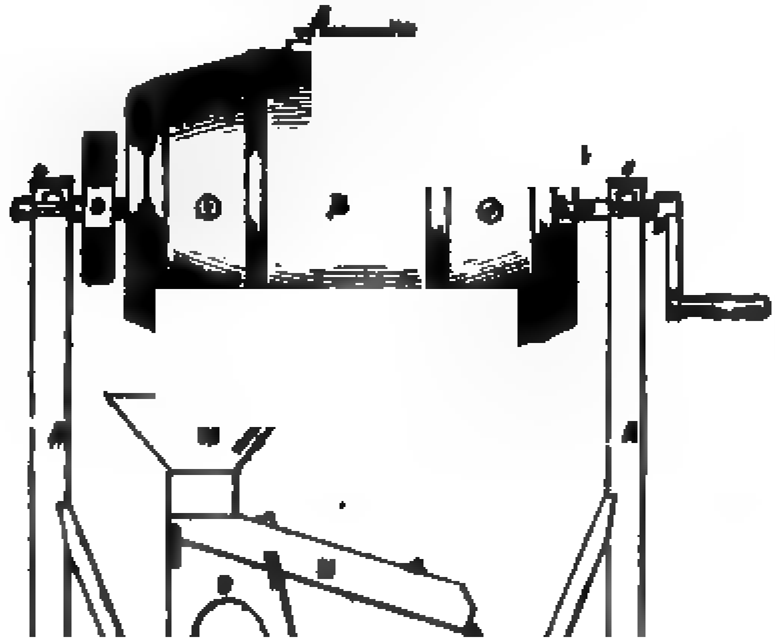


Fig. 2.

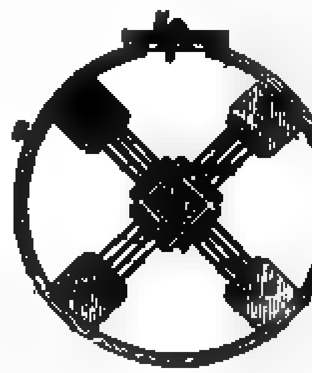
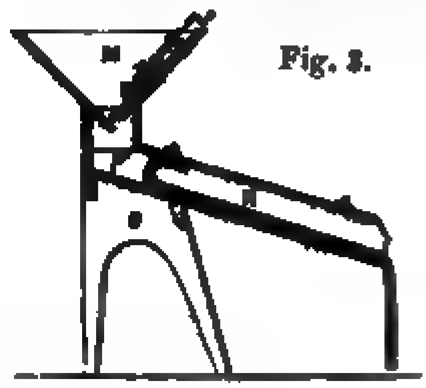


Fig. 3.



The mode of operating with the apparatus is as follows:—The ore is first reduced as nearly as possible to an impalpable powder, and then mixed with a small proportion of water. A quantity of loose mercury, proportioned to the amount of precious metal which the ore is supposed to contain, is introduced into the amalgamator through the aperture J, which is then closed; the mercurialised sieves having been previously inserted in the interior of the amalgamator, and fixed by attaching the end-cover, *b*. The amalgamator is then set in revolution, and kept rotating slowly, either by hand or power, until an amalgam is produced containing the whole, or nearly the whole, of the precious metal in the ore. The time necessary for obtaining this result is very much shortened as compared with the ordinary mode of operating, in consequence of the increased amount of chemical attraction exercised by the mercury in the minutely subdivided state which it is caused to assume in passing through the sieves. A small proportion of the gold or silver adheres to the mercurialized surfaces of the sieves whilst they retain their active attractive properties; but this is carried away as the action of the sieves becomes weakened by continued use.

When an amalgam has been obtained, the aperture in the barrel, B, is uncovered, and the contents allowed to pass into the hopper of the separator, which should be placed in a convenient position near it. The separator is composed of a hopper, M, and an inclined shoot, N, which are supported by the framing, O. The hopper is provided with a slide, P, by which its lower orifice can be entirely or partially closed when desired. In the interior of the inclined shoot, N, are arranged a set of sieves, P^1, two, three, or more, the upper ends of which are bent upwards and fastened to the top of the shoot. These sieves are composed of copper wire gauze or perforated copper, and are mercurialized by the same process as the sieves, E E, of the amalgamator, before described. The lower extremities of the sieves are carried downwards into the receiving-vessel, Q, into which the amalgam and refuse from the separator both pass.

The action of the separator is as follows: —The amalgam, refuse, &c., from the amalgamator having been introduced into the hopper, M, the slide of the hopper, which

had been previously closed, is slightly opened, so as to allow the matters to pass slowly to the sieves, P^1. The amalgam is then attracted by the mercurialized surfaces of the sieves, and gradually fills up their meshes until the gravity of the amalgam overcomes the force of attraction, when the amalgam flows down the inclined shoot, N, into the bottom of the receiving-vessel, Q. A continuous process of precipitation will then be carried on until the whole of the amalgam present is separated from the refuse. A portion of the refuse will, however, have been passing through the sieves from the commencement, and flowing along them into the receiver, Q, with the amalgam; but as the quantity of amalgam in the receiver accumulates, the refuse will be raised and thrown over the sides of the receiver, leaving the amalgam for subsequent treatment by distillation in the usual manner.

Mr. Baggs explains that he sometimes employs copper balls mercurialized, instead of sieves.

Utility of Swallows.—As a proof of the valuable services rendered by swallows, it is estimated that one of these birds will destroy, at a low calculation, 900 insects per day; and, when it is considered that some insects produce as many as nine generations in a summer, the state of the air but for these birds may be readily conceived. One kind of insect alone might produce 560,970,489,000,000,000 of its race in a single year.—*Galignani.*

Willichs' Popular Tables for Ascertaining the Value of Lifehold, Leasehold, and Church Property, the Renewal of Fines, &c. Third Edition. With Additional Tables of Hyperbolic Logarithms, Trigonometry, Astronomy, and Geography. Longman and Co.

The original scope of these valuable tables has been considerably extended by the additions which, as will be perceived by the title of the present edition, have been made to them by the author; and their sphere of usefulness has been made to comprehend a proportionately augmented number of important objects. With regard to the first portion of the work, which relates to tables of a purely monetary character, they are numerous, copious, well-arranged, and conveniently available for immediate reference, while their general accuracy, and the demand in which they are held for the valuation of property, is best attested by the rapidity with which the second and third editions have been called for. They include the means of computing the number of years' purchase of property of all kinds—whether absolute in perpetuity, or certain for a fixed term of years, present, or to commence at some determined day, or whether depending on the contingency of human life. All this has been done at several rates per cent., within limits fixed in each instance, according to the usual course of practice in each class of transactions respectively.

The general arrangement of the tables is excellent, and the typography admirably seconds the great aim of the author,—to assist the eye of his consulting readers. In this respect his labours have stripped this kind of tables of much needless intricacy; and the eye can have no difficulty in observing at once the number of years' purchase, or the present value per cent. of any sum of money subject to certain conditions. Values depending upon the longest of three lives are included in these tables, and have been computed by Mr. Willich, we believe, for the first time, upon the Carlisle tables, which agree more closely than the Northampton with the statistics of human mortality. A great number of interest and annuity tables are also given, and these are followed by tithe and exchange tables, and others in optics, astronomy, chronology, and chemistry. There are also a number of tables referring to law and taxation, which properly find a place in the collection. The purely mathematical part of the tables comprise the squares, cubes, square-roots, cube-roots, and reciprocals of the natural numbers, the logarithms to 1,200, and constants of frequent recurrence in analysis. The additional logarithmic tables enable the reader not possessed of extensive tables of this kind, to find the logarithm accurately to five places of decimals, or the natural number, with a corresponding degree of precision.

In a work of limited dimensions, embracing so many objects, it is not to be expected that logarithmic and trigonometrical tables should be published *in extenso.* In the form given by Mr. Willich, however, they will be found easily available in effecting computations to a degree of nicety beyond anything demanded for ordinary practical purposes. Upon the whole, they are likely to be of great use to numerous classes of society, and to become popular in that sense as well as in that implied in the title.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

John Anderson, of Rugby, Warwick, iron-founder. *For heating and ventilating apartments, and for remedying smoky chimneys, by a radiant ventilating grate.* Patent dated December 27, 1852.

In this arrangement the fire in a grate formed of iron bars in a series of concentric curves, radiates upon a steel, iron, brass, or copper ash-box placed over an air-chamber under the grate. This chamber is supplied with air by a tube communicating with the external air, and as the air in the apartment ascends the chimney, the external air enters the chamber under the grate through the tube, and, being heated, passes into chambers formed at the back of the fire. From the latter chambers the air enters the apartment through ventilators placed in the cheeks or sides of the fireplace, thus causing a constant supply of rarefied air in the apartment. The vitiated air will escape from the apartment through a ventilator placed above the chimney-piece near the ceiling of the room.

George Ingham, of Rochdale, Lancaster, carder. *For certain improvements in machinery for drawing cotton and other fibrous materials.* Patent dated December 27, 1852.

These improvements consist in imparting a traversing motion to the slivers drawing-frames, for the purpose of preventing the grooving of the top drawing rollers, occasioned by the slivers always passing in the same place. This is effected by causing the slivers, before they enter between the drawing rollers, to pass over a traversing bar, and between guide-pins projecting from its upper surface; this traversing bar receives a to and fro motion by gearing from the back drawing-roller, and as each sliver is guided by one of the pins on its surface, it is evident that they will be caused to traverse to and fro in passing to the drawing-rollers, and thus enable the object in view to be attained.

The patentee claims for imparting a traversing motion to the slivers of drawing frames for the purposes described, but does not limit himself to any particular combination of parts for effecting this object.

John Frederick Gordon, of Strangford Down, Ireland, clerk. *For facilitating the turning of four-wheeled carriages, and bringing the front and hind wheels nearer to each other, entitled "the caster axle."* Patent dated December 27, 1852.

According to Mr. Gordon's invention, the front wheels of the vehicle instead of being mounted on a single solid axle, made to turn about its centre lengthwise, have each distinct axles, and also distinct turning-points.

The arrangement adopted by the patentee, in accordance with this view, consists in constructing the front axle of the vehicle with an arm at each end, pinned between jaws or discs, and forming continuations of the axle, on which arms the front wheels are mounted. These arms serve also to carry the front springs, and are connected together by cross-rails in such manner as to be always parallel when the carriage is moving straight forward or turning. By this means the front wheels are brought much nearer to the hind wheels than usual, and almost immediately under the backmost part of the driver's seat. In some cases the front springs, instead of being connected to and moving with the axle-arms, may be, like the hind springs, immoveable fixtures.

Claim.—The construction of the front axles of four-wheeled carriages in such manner that each of the wheels mounted thereon shall move horizontally on independent centres, and at the same time be so connected as to preserve their parallelism when going straight or turning.

George Fergusson Wilson, of Belmont, Vauxhall. *Improvements in treating certain fatty bodies.* Patent dated December 27, 1852.

This invention consists in acting on "Bornean vegetable tallow," (which is a vegetable material recently imported from Borneo, resembling tallow), and on "nutmeg butter" by powerful acids, and in distilling such matter after being acted on by acids, and thereby producing valuable products suitable for the manufacture of candles.

The acid process adopted by the patentee is conducted in the following manner:—The Bornean tallow or nutmeg butter is placed in a copper vessel or a wooden vessel lined with sheet lead, and gradually heated up to 350 Fahrenheit; after this, concentrated sulphuric acid is added in the proportion of 720lbs. to every 6 tons, and at the end of about three hours, the tallow is pumped into a vessel containing acidulated water, and agitated by free steam passing through it for about two hours, when it is allowed to repose: or the tallow is heated only to 120 Fahrenheit, and a ton and a half of concentrated acid is run very slowly into the vessel, stirring the while, and then keeping the mixture stirred for about twelve hours, after which hot water, equal to half the bulk of the fatty material is added, and the whole well stirred up and allowed to repose for four hours.

After either of these processes, the tallow or butter is distilled in a still from which

the atmosphere is excluded, which is best effected by means of steam, vapour, or other product not containing oxygen. The patentee prefers, however, to use highly-heated steam, introduced in numerous jets or streams below the fatty material in the still, and thus to cause the distillation and exclusion of air to be effected by the same means, assisting the former process by the aid of a fire under the still. The distilled products are received in a condenser, and when condensed may be used alone, or be mixed with other candle-making materials for making candles and nightlights of the better class, or the process of distillation may be altogether dispensed with in making candles and nightlights of inferior descriptions.

George Gwynne, of Hyde-park-square, Esq., and George Fergusson Wilson, of Belmont, Vauxhall. *Improvements in treating fatty and oily matters.* Patent dated December 27, 1852.

The patentees observe, that it has been found that fatty and oily matters which have been treated or operated on with nitrous, hyponitrous, or allied acids do not burn well, in consequence, they believe, of a combination or intimate mixing of the acid in the fats or oils. And their invention consists in improving fats and oils which have been so treated by causing them to be acted on by a salt of a weaker acid, such as acetate of ammonia or others.

The process of hardening fatty matters by nitrous fumes, was described in the specification of a former patent to Messrs. Gwynne and Wilson, Dec. 8, 1842, and is still conducted much in the same manner, until the distinct evolution of nitrous fumes takes place, when the boiling is checked by admitting cold water, and the acetate of ammonia is added in the proportion of 4lbs. to every cwt. of fatty matters. After this the mixture is well stirred, and allowed to repose for four hours, when the supernatant fatty matter is to be drawn off and filtered in a warm room, and is then ready to be made into candles and night-lights.

Other salts of weaker acids may also be similarly employed, but if liable to act injuriously in the burning of the fatty matters, as is the case with acetate of soda, a subsequent boiling of the mixture with acidulated water and free steam, should be resorted to.

John Mason, of Rochdale, Lancaster, machine maker. *Improvements in machinery or apparatus for preparing and spinning cotton and other fibrous substances.* Patent dated December 28th, 1852.

Claims.—1. The adaptation of apparatus in connection with a first and second teazer for conveying oil or equivalent matter to wool and other fibrous materials as they pass from the one machine to the other. Also, conveying oil, or equivalent matter, to wool by causing the mass to be saturated, and the superfluous quantity subsequently squeezed or thrown out.

2. As applied to carding engines,—the employment of apparatus for regulating the speed of the feed or drawing-off rollers, such regulation being effected through the agency of parts which are caused to alter in position according to the quantity of material passing in contact with them.

3. The application to condensing carding engines of a revolving stripper of wire-cards, or other suitable material.

4. Mounting the rings of wire-cards, or their equivalents, used in condenser carding engines, upon surfaces which are of greater diameter than the spaces between such rings.

5. The application of plates to the edges of the rings of cards, or their equivalents, employed in condenser carding engines.

James Darling, of Manchester, book-keeper, and Henry Spencer, of Rochdale, manager. *For improvements in machinery or apparatus for preparing and spinning cotton and other fibrous substances.* Patent dated December 28, 1852.

Claims.—1. The application of separate bushes to the saddles or other parts for carrying the roller weights of preparing and spinning machinery, capable of removal at pleasure.

2. The application of a spring, or other yielding elastic part, to the guide-wires of spinning machines.

3. The application to flyers of an eye or part against which the yarn acts, of porcelain, glass, or other material, such part being capable of renewal at pleasure.

4. Making the flanges of bobbins used in preparing and spinning machinery of metal, horn, bone, or other material capable of being used thinner than the wooden flanges now employed.

William Beckett Johnson, of Manchester, Lancaster, manager to Messrs. Ormerod and Sons, engineers and iron-founders. *Improvements in steam-boilers and in apparatus connected therewith.* Patent dated December 28, 1852.

The patentee describes and claims—

1. In reference to steam-boilers,—the use or employment of water spaces or other partitions constructed in a chamber between the furnace or furnaces and the tube or tubes, such water spaces or partitions being placed at right angles to the length of the furnace or furnaces, or at such other angle that the products of combustion shall be caused to mingle.

2. In pumps for supplying boilers with

water,—constructing the pump barrel and steam cylinder cover of one piece, or connecting them directly together.

3. In water-gauges—the use or employment of a glass cylinder, in which moves the spindle of a float, for the purpose of indicating the height of water in the boiler.

4. In steam-gauges—the use or employment of a cylinder, piston, and spring, combined with a signal whistle for the purpose of indicating the pressure and excess of pressure of steam in boilers.

Pierre François Giraud, of Paris. *An apparatus for the interior of bonnets, to fix them on the head.* Patent dated December 28, 1852.

This apparatus consists of a light framing of thin steel or other springs, fitted to the interior of the bonnet. The framing is composed of an adjustable ring, which fits into the back part of the bonnet, and is connected by side pieces to an arched or bow piece, which passes over the front part of the head, and the ends of which are sewn to the bonnet lining. Two branches are also attached to the bow piece, extending backwards above, and nearly parallel to, the side pieces, and their ends are also sewn to the bonnet-lining. This arrangement prevents the bonnet falling off, and also serves to preserve its shape when otherwise it would be crushed or bent out of form.

The claim is for the combination of parts described and shown, forming an apparatus for the interior of bonnets, to fix them on the wearer's head.

Edward Mucklow, of Bury, Lancaster, manufacturing chemist. *For certain improvements in the construction of retorts for the manufacture of pyroligneous acids, or for other purposes of destructive distillation.* Patent dated December 28, 1852.

Mr. Mucklow's improved retorts may be either cylindrical, rectangular, or of any other suitable form, placed in a perpendicular position, and having the fire applied either externally or internally. In the former case the retort is closed at both ends, and has in its interior a hollow perforated cylinder, or a cylinder composed of a series of conical rings placed one above the other, but so as not quite to touch each other at their edges. A space is left between the cylinder and the outside of the retort in which the ligneous material to be distilled, whether in the state of sawdust or billets, is placed. In the space at the centre of the cylinder are placed pipes for the circulation of cold water, in order that the vapours evolved from the wood may be the more readily condensed, and that without coming in contact with any heated surface. When the fire is applied internally, a fire flue is formed in the centre of the retort, and around this flue is the space for the wood to be distilled, enclosed by a perforated cylinder, or a casing of conical rings, outside of and between which and the exterior casing the condensing space is formed.

The claim is for the improvements in the construction of retorts for the manufacture of pyroligneous or acetic acid, whereby the vapours evolved by the destructive distillation do not come into contact with the heated surface of the retort, but pass off immediately into a comparatively cool space or chamber.

Edward Mucklow, of Bury, Lancaster, manufacturing chemist. *Certain improvements in machinery or apparatus for cutting or rasping dye-woods.* Patent dated December 28, 1852.

This invention is designed to prevent the waste and loss of time occasioned by the uncut portions splintering off the lower edge of logs of dye-wood during the process of cutting or rasping, and consists in the employment of a stationary bar, knife, or cutter of metal, which is to be placed at an angle of 45° immediately below the lower edge of the log of wood under operation, and which thus acts as the lower blade of a pair of shears, and so causes the wood to be cut clean, leaving no uncut portion or splinters.

Claim.—The application, employment, or use in machines for cutting or rasping dye-woods (of whatever construction, whether "barrel-rasps" or "plate machines") of a stationary knife or cutter, placed at such an angle immediately below the extreme edge of the log as shall prevent splintering, and accomplish the perfect cutting of the same.

William Busfield, of Bradford, York overlooker to Messrs. Waud and Co., of the same place. *Improvements in apparatus for combing wool and other fibrous substances requiring like processes.* Patent dated December 28, 1852.

These improvements have relation to preparing and combing-machines of the class patented by Messrs. S. C. Lister and G. E. Donisthorpe, 24th February, 1851, and consist in giving to the gills a curved form in a vertical direction, and in forming the nipping surfaces of the nipping instruments and the transfer comb used in such machines of like curved form, in order that the various fibres at any one time conducted by these instruments may be laid uniformly, or nearly so, in the direction of their length into the circle of passing combs, or laid of a curved form to suit the circle of the passing combs.

Claim.—Giving to the gill-combs, the nipping surfaces of the nipping instruments, and the carrying or transferring comb a

curved form in manner and for the purpose explained.

JAMES WEBSTER, of Leicester, engineer. *Improvements in the manufacture of springs.* Patent dated December 28, 1852.

This invention consists in manufacturing springs by bending a bar or rod of steel into a double-coned form, the larger part or base of the one cone being towards the larger part or base of the other. In carrying out the invention, the patentee employs a grooved mandril, tapering from the centre towards each end, and mounted on an axis. One end of the bar from which the spring is to be produced is fixed to the axis by a sliding clamp, and the axis and mandril are caused to revolve, when the bar is wound on to the inclined track around one cone till it comes to the larger diameter at the centre of the mandril, where one or more cylindrical coils are produced; the bar is then again bent in to the inclined track, thus producing the second conical form, which completes the spring. The mandril and spring are at once removed from the axis, and the mandril (which is made in two parts) is removed by opening out the spring at the cylindrical portion. The whole operation is performed while the bars are in a heated state, and the parts which were opened out to allow of the removal of the mandril are brought close together in a vice, or by other means. The bars or rods employed may be of a circular or elliptical section, as may be preferred. No claim.

CLAUDE JOSEPH EDMEE JUNOT, of Rue Basse Passy, France. *Improvements in the mode of reducing several metallic substances, hitherto unused, and applying them so prepared to the plating of other metals and substances by means of electricity.* (A communication.) Patent dated December 28, 1852.

This invention consists in preparing silicum, titanium, tungsten, chromium, and molybdenum, by causing them to be dissolved, and then by means of electric currents to be deposited on to metals and other substances. In carrying out the invention, solutions of tungsten, silicium, and molybdenum are produced from tungstic, silicic, and molybdic acids obtained by the ordinary processes, either of which is dissolved in a boiling solution of carbonate of soda; after which distilled water is added, and the solution reduced to a proper strength for being used in the subsequent process (say 7° to 8° Baumé); chromium is obtained in solution by double chloride of soda and ammonia, and titanium by sulphuric acid, which being evaporated, sulphate of soda and ammonia, with distilled water, are added, as in the case of the other solutions. The article to be coated is immersed in either of these solutions, and connected to the zinc terminal of a battery, and the other terminal of the battery is connected to a plate of platinum also immersed in the solution, and a bag of woven fabric containing a portion of the salt used is suspended in the solution to preserve its strength. The deposition will then take place in the ordinary manner. The metals may be deposited alloyed together, or with silver, nickel, or other metal.

Claim.—The preparing solutions of silicum, titanium, tungsten, chromium, and molybdenum, and causing them to be deposited by electric currents.

SAMUEL CLEGG, of Regent-square, Middlesex. *Improvements in apparatus for measuring gas.* Patent dated December 28th, 1852.

The objects of Mr. Clegg's improved apparatus are, first, to measure gas by passing it at an uniform pressure through an opening whose area is adjusted according to the quantity of gas drawn from the meter by the burners; and, second, to regulate the heights of the gas flames at the burners, or to maintain them at a certain height, irrespective of the number in use.

The gas entering the meter from the street mains is conveyed into a governor, of the construction patented by Mr. Clegg in 1815, floating in water, which, rising or falling with the varying pressure of the gas, decreases or increases the area of the opening admitting it, and thus reduces the gas to one uniform density, permitting it to flow onwards at an unvarying pressure. The governing-hood is adjusted so as to be of equal weight at all points of immersion, and is covered by a vessel connected with the external atmosphere. The gas now passes through a measuring-opening, over which works a slide-valve, which is actuated so as to increase or diminish the area of the opening by means of a second governor of similar construction, into the hood of which the gas is discharged from the measuring-opening before mentioned. This vessel rises and falls in accordance with the quantity of gas drawn from it to the burners, and its motion is caused to work the slide over the measuring opening. If no burners are lighted, the gas entering the hood will fill it and cause it to rise to the full extent of its motion, and close the slide; but when one burner is lighted, a portion of the internal pressure will be removed, and the hood will fall to a certain extent, and open the valve in proportion; and when all the burners are lighted, the hood will fall to its fullest extent, and open the valve wide; and the amount of motion of the hood and valve will always be in proportion to the number of burners lighted. The area of valve-opening being adjusted by previous experiment

to the total quantity of gas the meter is intended to register, will thus become an accurate measure for all lesser quantities; because the pressure is always uniform, and the area of the opening in exact proportion to the quantity of gas discharged through it.

The motion of the valve is communicated to the train of wheel-work forming the index of the meter by means of an arrangement of levers, governed in their action by clockwork working a ratchet-wheel in connection with the wheelwork of the index; the parts being arranged so as to impel the ratchet at a rate varying with the amount of gas passing through the apparatus. When the spring of the clock-movement is down, the gas is shut off from the burners by the first wheel of the clock lifting a valve, which is so contrived that on the lifting-wheel ceasing to revolve, it shall fall and shut off the gas.

Claim.—The adaptation of the common governor, patented by Mr. Clegg, in 1815, to the purposes of a gas-meter; the construction of the valve which admits the gas from the governor to the outer vessel; and the modes of regulating the motion of the wheelwork, and shutting off the gas when the spring is down.

FRANCIS ALTON CALVERT, of Manchester, engineer. *A universal ratchet drill.* Patent dated December 28, 1852.

In this instrument rotary motion is given to the drill by means of two bevel ratchet pinions, which gear into a pinion mounted on the drill-spindle. The driving-pinions are mounted loosely on studs within a forked part at the end of the handle, and these studs are screwed into the sides of the block which carries the drill-spindle, and serve also as fulcrums for the handle. The ratchet-pinions are driven by spring catches on the handle working into their teeth, which are set in opposite directions, so that rotary motion is imparted to the drill when the handle is moved in any direction, upwards, downwards, laterally, or diagonally, and thus in drilling a hole the handle may be at almost any angle with respect to the drill.

Claim.—The universal ratchet drill shown and described.

PROVISIONAL PROTECTIONS.

Dated April 2, 1853.

786. Sir James Caleb Anderson, baronet, of Fermoy, Cork, Ireland. Improvements in locomotive engines.

Dated April 18, 1853.

934. Hans Wallace Allen, civil engineer, of Great Portland-street, Portland-place, London, and of Cheltenham, Gloucestershire. A furnace which he calls the "Vestal furnace," for the carbonization of peat or turf, or other substances.

Dated May 28, 1853.

1321. Edward Duclos de Boussois, of Paris, mining engineer. Improvements in preventing incrustation of steam boilers.

Dated May 30, 1853.

1325. Joseph Brown, upholsterer, of Leadenhall-street, London. Improvements in elastic spring beds, mattresses, cushions, and all kinds of spring stuffing for upholstery work generally, making them lighter and more portable.

Dated June 6, 1853.

1390. Frederick Lott, of Bloomfield-place, Pimlico, Middlesex. Inprovements in cartridges.

1392. Delabere Barker, of Douglas-road, Islington, Middlesex, gentleman. Certain improvements in the manufacture of blinds, shades, and other screens from glass and other vitreous substances, also in the method or methods of raising, lowering, folding, and regulating such blinds, shades, and other screens.

Dated June 9, 1853.

1405. To George Bott, of Birmingham, Warwick, retail brewer, and William Rushton, of Ashton, near Birmingham maltster. A new or improved method of preventing collisions on railways.

1406. Henry Bernoulli Barlow, of Manchester, Lancaster, consulting engineer. Improvements in machinery for spinning, doubling, and twisting cotton and other fibrous substances. A communication.

1407. George William Garrood, of Maldon, Essex. Improvements in propelling vessels.

1409. Claude Arnoux, of Paris, France, gentleman. A new system of towing and traction.

1410. William Muir, of Manchester, Lancaster, engineer. Improvements in turning lathes, a part of which improvements is applicable to other useful purposes.

1411. Joseph Smith, of Bradford, York, worsted spinner. Certain improvements in machinery for preparing and spinning wool, hair, silk, flax, and other fibrous substances.

1412. Joseph Smith, of Bradford, York, worsted spinner. Certain improvements in combing wool and other fibrous substances.

1413. Edward Maniere, of Bedford-row, Middlesex, gentleman. Improvements in the manufacture of paper.

1414. William Brookes, of Chancery-lane, Middlesex. Improvements in treating fabrics suitable for floor-cloths, covers, and such like articles. A Communication.

1415. William Brookes, of Chancery-lane, Middlesex. Improvements in the manufacture of boxes and other hollow receptacles. A communication.

1416. James Robert Napier, of Lancefield-house, Glasgow, Lanark, mechanical engineer and iron ship builder, and William John Macquorn Rankine, of Rosebank-house, Rutherglen, county aforesaid, civil engineer. Improvements in engines for developing mechanical power by the action of heat on air, and other elastic fluids.

Dated June 10, 1853.

1417. Auguste Chesneau, of Leicester, Leicestershire, oil merchant. A new method of obtaining steam power.

1419. Josiah Moore, of Clerkenwell-close, Middlesex, clock manufacturer. Improvements in respirators.

1420. Samuel Frankham, of Greenland-place, Judd-street, Middlesex, engineer. An improved

construction of coupling joints applicable to pipes, vessels of capacity, and other like uses.

1421. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. An improvement in spinning machinery. A communication.

1422. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Company, Fleet-street, London, patent agent. Improvements in the manufacture of paper. A communication.

1423. Joseph Westwood and Robert Baillie, both of Poplar, Middlesex, iron ship builders. Improvements in the construction of iron ships.

Dated June 11, 1853.

1424. Christopher Nickels, of Albany-road, Surrey, and James Hobson, of Leicester. Improvements in the manufacture of carpets and other piled fabrics.

1425. Christopher Binks, of Albert Villa, North Woolwich, Kent. Improvements in dryers, and in preparing drying oils for oil paints, varnishes, and other uses.

Dated June 13, 1853.

1426. Hugh O'Connor, of Frederick-street, Limerick. Digging the soil by means of machinery with horse-power.

1427. William Henry Smith, of Bloomsbury, Middlesex, civil engineer. Improvements in the permanent way of railways.

1428. William Smith, manufacturer, of Sheffield, York. Improvements in the mode of manufacturing metallic handles for knives and forks, backs for razors, bows for scissors, and the relative parts of such-like instruments.

1429. John Marsh, Theophilus Marsh, James Marsh, and Walter Marsh, trading under the style or firm of Marsh, Brothers, and Company, of Sheffield, York, manufacturers. An improved mode of fastening the handles of table knives and forks.

1430. Joseph Spencer, of Bilston, Stafford, iron-founder and engineer. A new or improved cupola.

1431. Thomas James Perry, of the Lozells, Aston juxta Birmingham, Warwick, engine-turner. An improvement or improvements in raising and owering Venetian and other blinds, applicable also to the raising and lowering of other bodies.

1433. William David Paine, of Thomas-street, Stamford-street, Lambeth, Surrey, mechanical engineer, and George Alfred Paine, of Clark's-mews, Saint Marylebone, Middlesex, clock-maker. An improvement in the construction of steam boilers, and in steam boiler furnaces.

1435. Robert Hopkins, of Manchester, Lancaster, mechanical engineer. Improvements in machinery or apparatus for cutting and shaping cork-wood and other similar substances.

1436. Joseph Webb, of Mayfield-terrace, Dalston, Middlesex. Improvements in obtaining motive power.

Dated June 14, 1853.

1437. William G. Craig, of Newport, Monmouth, engineer. Improvements in axle-boxes, guides, and bearings of locomotive engines and carriages, parts of which improvements are applicable to the bushes and bearings of machinery.

1438. Robert William Sievier, of Upper Holloway, Middlesex, gentleman, and James Crosby, of Manchester, Lancaster, manufacturer. Improvements in looms for weaving.

1439. Joseph H. Penny and Thomas B. Rogers, of New York, America. A new and useful improvement in the manner of constructing machinery for propelling vessels and other machinery, which they term a crank propeller.

1440. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in railway brakes. A communication from Francis A. Stevens, of Burlington, Vermont, United States.

1441. Thomas Richardson, of Newcastle-upon-Tyne, manufacturer. Improvements in the manufacture of certain salts of magnesia, and a red colouring matter.

1442. Joseph Leon Talabot, of Chaussée d'Antin, Paris, and John Davie Morries Stirling, of the Larches, near Birmingham. Improvements in the manufacture of iron.

1443. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. An improved mode of manufacturing cast steel. A communication.

Dated June 15, 1853.

1444. George Burstall, of Fenchurch-street, London, merchant. Improvements in the bleaching of oils and fats, and in machinery and apparatus connected therewith.

1446. Thomas Butterworth, of Meanwood, Yorkshire, gentleman. A machine for ploughing land, harrowing and crushing clods at one operation.

1448. Alexander Robertson, of Holloway, Middlesex, engineer. Improvements in vessels or cases for storing and preserving edible substances.

1450. John Macintosh, of Pall-Mall East, Middlesex, C. E. Improvements in the construction of portable boats or vessels and buoys.

1452. Jules Dehau, of Rue Pigale, Paris. Improvements in the manufacture of woven fabrics, yarn, cordage, ropes, paper, and pasteboard by the application of a material not hitherto used in Great Britain for such purposes.

1454. John Jeremiah Payne, of Upper King-street, Bloomsbury, Middlesex. Certain improvements in axles.

1456. John Elliott, of Oak-lane, Limehouse, Middlesex, engineer, and John Brown of the same place, engineer. Improved machinery for making rivets, spikes, and screw blanks.

Dated June 16, 1853.

1458. William Baddeley, of Angell-terrace, Islington, Middlesex, engineer. An improved label damper.

1460. William Henry Grey Field, of Kennington, Surrey. Certain improvements in the construction of barges and vessels and in the mode of steering.

1462. John Blair, of the firm of John Blair and Co., New Milns, Ayrshire, Scotland, cutters. A new and improved mode of cutting lappet cloths or other similar fabrics.

1466. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of Fleet-street, London, patent agent. Improvements in machinery for sawing stone and marble. A communication.

1470. Robert Mortimer Glover, of Newcastle-upon-Tyne, M.D. Improvements in the production of chlorine and for the manufacture of black oxide of manganese.

1472. Joseph Warren, of Maldon, Essex, iron-founder. Improvements in ploughs.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," April 2nd, 1853.*)

214. Louis Christian Koeffler. Improvements in bleaching and dyeing.

222. Henry Avins and George Tarplee. A new or improved brick.

229. Francis Whishaw. An improved lock or system of locks.

(*From the "London Gazette," June 28th, 1853.*)

140. Cornelius Ward. A new construction of the musical instrument designated the bassoon.

141. Cornelius Ward. Combining the musical instruments designated the drum, and the cymbals, in such manner as to make them as one instrument, which instrument he terms "the cymbal drum."

241. Jean Baptiste Lavanchy. Improvements in the construction of collapsable framework of wood or iron, which may be employed for forming portable bedsteads, houses, parts of houses, or bridges, and other similar structures, which may occasionally be required to be removed from place to place with facility, economy, and despatch.

247. Samuel Perkes. Improvements in the mode of constructing certain works applicable to aquaducts, viaducts, railways, canals, rivers, docks, harbours, light-houses, breakwaters, reservoirs, tunnels, sea-walls, embankments, submarine foundations, and other useful purposes.

260. Marc Louis Adam Tarin An improved dust-pan.

161. Marc Louis Adam Tarin. Improvements in reflectors for diffusing light.

264. Charles Cattanach. Certain apparatus for measuring the human figure, and for transferring the said measurement to cloth.

267. Charles Hadley. Improvements in the construction and formation of granite and stone pavements, and surfaces for carriage and railways.

269. Eliezer Edwards. A new or improved bedstead which may be used as a vehicle.

318. George Hewitson. Improvements in machinery or apparatus for measuring or indicating the length of yarn as it is spun or wound on bobbins or rollers.

355. William Fulton. Improvements in the treatment, cleansing, or finishing of textile fabrics.

376. William Pidding. Improvements in crushing, drilling, or otherwise treating ores, stone, quartz, or other substances in mining operations, and in the machinery or apparatus connected therewith.

377. William Pidding. Improvements in the treatment of oleagenous, fatty, or gelatinous substances for purifying, decolourizing, compounding, or clarifying the same.

414. William Pidding. Improvements in the treatment and preparation of saccharine substances, and in the machinery or apparatus connected therewith.

435. James Anderson. Improvements in obtaining motive power.

557. Thomas Wells Cross. A portable fire-engine.

645. François Durand. An improved kind of loom.

668. Malcolm Baxter. Improvements in steam-engines and pressure regulating valves.

826. Henry Alfred Jowett. Improvements in apparatus for heating, which improvements are particularly applicable for generating steam or evaporating solutions, and may be applied for heating purposes generally.

1082. Frederick Lipscombe. Improvements in propelling vessels.

1200. Stephen Garrett. Improvements in the preparing and tanning of skins, hides, or pelts of animals.

1217. James Thomas George Vizetelly and Henry Richard Vizetelly. Improvements in printing machines. A communication.

1282. Louis Auguste Deverte. An improved machinery for combing wool.

1302. Julius Augustus Roth. Improvements in the mode of, and machinery for, treating the fibres of flax, hemp, China grass, and other analagous substances preparatory to spinning. Partly a communication.

1357. Robert Smith Bartlett. Improvements in the manufacture of needles.

1379. Joseph Burch. Certain improvements in fans, blasts, or blowing apparatus.

1380. William Dray. An improved method of driving shafting.

1396. Frederick Lipscombe. Improvements in the construction of ships and boats.

1403. George Tillett. Improvements in portable houses and buildings.

1404. John Horrocks, junior, and James Dunlop Horrocks. Improvements in the manufacture of detonating or percussion caps. A communication.

1411. Joseph Smith. Certain improvements in machinery for preparing and spinning wool, hair, silk, flax, and other fibrous substances.

1412. Joseph Smith. Certain improvements in combing wool and other fibrous substances.

1413. Edward Maniere. Improvements in the manufacture of paper.

1414. William Brookes. Improvements in treating fabrics suitable for floor-cloths, covers, and such like articles. A communication.

1415. William Brookes. Improvements in the manufacture of boxes and other hollow receptacles. A communication.

1419. Josiah Moore. Improvements in respirators.

1421. Alfred Vincent Newton. An improvement in spinning machinery. A communication.

1423. Joseph Westwood and Robert Baillie. Improvements in the construction of iron ships.

1433. William David Paine and George Alfred Paine. An improvement in the construction of steam boilers, and in steam boiler furnaces.

1448. Alexander Robertson. Improvements in vessels or cases for storing and preserving edible substances.

1456. John Elliott and John Brown. Improved machinery for making rivets, spikes, and screw blanks.

1458. William Baddeley. An improved label damper.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed June 24, 1853.

1852:

1158. William Ramsell.

1165. William Tuer, William Hodgson, and Robert Hall.

1853:

147. William Williams.

252. Edwin Pugh.

316. Richard Prosser.

447. John Charles Pearce.

460. Samuel Cunliffe Lister.

721. William M'Naught.

858. Adolphe Marius Alexandre Iglesia.

984. James Napier.

1003. Uriah Scott.
1061. George Murton and William Hatton Langshawe.

Sealed June 28, 1853.

1852:
1173. James Darling and Henry Spencer.
1174. William Beckett Johnson.
1175. Pierre François Giraud.
1177. Edward Mucklow.
1178. Edward Mucklow.

1853:
7. Joseph Brough.
10. David Hulett.
16. Edward Clarence Shepard.
23. Gustave Paul de L'huynes.
26. Francis Edwards.
42. William Sykes Ward.
43. William Watson, the younger.
55. John Abraham.
481. Antonio Fedele Cossus.
957. Sir William Snow Harris.
1027. Alfred George Anderson and John Barker Anderson.
1036. Thomas Revis.
1073. Robert Walter Swinburne.
1084. George Bell.
1094. John Scott Russell.
1095. Charles Goodyear.
1101. Joseph Dempsey Holdforth.
1114. George Dowler.
1115. Augustus Brackenbury.
1125. James Nichol.
1127. John Pullman.
1128. Henry Warner, Joseph Haywood, and William Cross.
1146. Octavius Henry Smith.
1148. George Tillett.
1164. William Bradbury and Frederick Mullet Evans.
1213. George Berry.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
June 28		J. Parkes and Son	Birmingham	Sun-dial rule.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1561.] SATURDAY, JULY 9, 1853. [Price 3d. Stamped 4

Edited by R. A. Brooman, 166, Fleet-street.

BROOMAN'S PATENT SUGAR-PRESS.

Fig. 2.

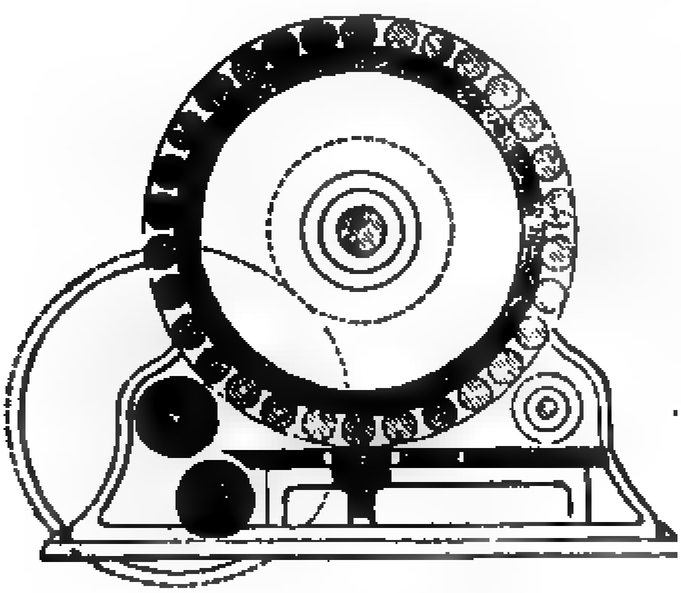


Fig. 1.

Fig. 3.

Fig. 4.

BROOMAN'S PATENT SUGAR-PRESS.

(English patent dated October 7, 1852. See vol. lviii., page 317.)

The accompanying engravings represent an improved sugar-press, in which the juice is obtained by rolling-pressure from the cane, beet-root, or other substance containing saccharine matter to be extracted, and which, together with other improvements in the sugar-manufacture, its machinery and apparatus, is described in this patent—a communication from a foreigner residing abroad.

Fig. 1 is a longitudinal section, and fig. 2 a transverse section of the press constructed according to this patent. A is a cylinder or roller, revolving loosely on the shaft, B, which is supported in bearings in the frame, A^1 A^1. C C are two discs keyed upon the shaft, B; D D are small friction-rollers, the axes of which have their bearings in the discs, C C; E E are feeding-rollers, driven by a wheel gearing into a pinion on the shaft, B, at a different speed to that of the main roller, A. F is a table, perforated for the escape of the juice expressed, and which may be made to move nearer to or further from the rollers, D D, by means of a screw or any other suitable adjustment.

Supposing the sugar-cane to be the substance operated upon, when it is passed between the feeding-rollers, it becomes subjected to a succession of pressures from the small rollers surrounding the periphery of the main friction-roller, A. The points of pressure are so numerous, and consequently so continuous in their action, as to express the whole, or very nearly the whole, of the juice from the cane; and only dry megass issues from the further end of the table.

Fig. 3 is a longitudinal section, and fig. 4 a transverse section of a modification of the press just described. A is a plain cylinder, keyed on the shaft, B, supported in bearings in the frame, A^1 A^1. C C are two fluted or indented rollers, over which the friction-rollers, D D, travel. These rollers are connected by the endless chain, E E E. F F is an iron grating, or perforated table, the upper surface of which is eccentric with the cylinder, A, as shown in fig. 4. It may, however, be concentric with it. The rollers, D D, travel along the upper surface of the table, F F. Motion is communicated to the rollers, C C, by a pinion fixed upon the main shaft, B, at such relative speed as shall be found the best in practice, according to the nature of the substance operated on. The cane, or other substance, is fed at the opening, G, and is then drawn forward and delivered at the opposite side of the machine, receiving a graduated pressure in its progress. Instead of the plain cylinder, A, here shown, the patentee suggests a cylinder surrounded with small friction rollers. Instead, also, of an endless chain of rollers, rollers working in fixed bearings might be substituted.

COOKE'S ELASTIC CAULKING FOR SHIPS.

The *Scientific American* of the 18th ult. gives an account of the mode of caulking ships with elastic substances, which has been invented by Mr. B. F. Cooke, of Boston.

In the construction of vessels, the process of caulking the seams so as completely to exclude the water, forms an important part of the operation. This has heretofore been done by chamfering the outer edges of the planks, and then driving oakum or other similar material between them. An objection to this mode of caulking is the well-known fact that the working and straining of the vessel has a tendency to throw the oakum out, and render recaulking necessary; while, at the same time, as the planks are not driven so close together, and consequently cannot form a close joint, the hull will be less stiff and rigid than is desirable. The improvements invented by Mr. Cooke obviate these objections, and consist in rendering the seams water-tight by placing between the edges of the planks some adhesive elastic substance or material, such as India-rubber, gutta percha, or compound of both. This may be done by forming a groove in the centre of the edge of each plank, and placing in the groove a strip of India-rubber, gutta percha, or other elastic material, and then driving the planks closely together, the edges of the planks not being bevilled but square, so that they will form a close rigid joint. If desirable, it may be coated with a rubber cement, or compound.

Two methods are represented in the figures which accompany the article. The one consists, as already suggested, in forming a groove in each plank, filling it with a long strip of the elastic substance, and bringing the flat edges of the planks into contact.

This strip of caulking may be round and tubular, or of any other required form, so as to fill the channel, which may also be of any shape desired—the planks thus grooved or plowed are driven together, with a coat of elastic cement between them, if it is thought advisable. The caulking introduced between the planks in the second method is somewhat different. In this case the planks are not grooved as in the other instance, but are planed square, and a flat piece of the elastic caulking is doubled and placed between the edges, thus inlaying all the joints by the elastic material. The edges of this caulking may overlap the external corner of the plank, and be connected to the plank upon the outside, or the joints may be simply inlaid without the overlapping, as may be required. The ends of the planks and the seams of the upper works, or other parts of the vessel, may be caulked in the same manner. By the above method of caulking a vessel, it will be seen that the necessity for chamfering the edges of the plank is entirely obviated; and by cutting the edges square, and placing between them an adhesive elastic substance, the joint will be impervious to water, and at the same time the hull remain extremely stiff and firm, while the caulking cannot be worked ut by the straining or working of the vessel, as frequently occurs in the method of caulking heretofore practised.

PROFESSOR FARADAY AND TABLE-TURNING.

In our last Number we extracted from Professor Faraday's letter to the *Times* the account of the experimental investigation instituted by him with a view to disprove the phenomena of table-moving, of the fallacy of which, he says, he had previously been convinced. That letter contains the promise of a more ample exposition in the *Athenæum* of Saturday last of his examination of the subject, and the learned professor has kept his word. His elaborate verification of his suspicions has no doubt undergone a close study by thousands, who have considered it with the attention which is due to the elevated position in science of the authority whence it has come. It will be found, however, to add very little, as regards the conclusion at which he arrives, and the reasoning upon which that conclusion is based, to that which he promulgated in the *Times*. He describes with more minuteness, and we may say with more clearness, the particular arrangements which he employed, and the observations he made with them; but in point of principle, the entire course of the inquiry is substantially presented to the reader in the portion of his letter which our last week's Number contained. This being the state of the subject, then, if we recur to it after it has engaged so much of the attention of Mr. Faraday, and venture deferentially in opposition to so ingenious an investigator to express our dissent from his conclusions, and the mode in which he has substantiated them, it is not because we feel any strong desire to establish the reality of the phenomena of table-moving, supposing them to have received a severe shock from his researches, but because we are anxious that a subject which, collaterally with others, appears to involve a principle, the future development of which may have consequences precious for science, should not be hastily disposed of upon grounds which seem to us insufficient and illusory.

The objections we entertain to the methods of investigation described by Mr. Faraday, are, that they are not such as the general nature of the facts would suggest to one desirous of referring them to mechanical action; that in the state of circumstances which he creates, the criteria upon which his conclusions proceed, are wholly fallacious; and that, notwithstanding his care to perform the experiment strictly according to the prescribed rules, it has been completely vitiated by the introduction of new elements, which ought to have been excluded. Proposing to deal in the last place with the merits of the arrangement as affording an obvious evidence of the presence of physical force, we shall consider very briefly the two other points in connection with each other; because, disputing altogether the convenience of the means employed with reference to the object in view, they involve collectively a matter of subordinate importance.

Let us consider, then, whether the indications of the lever are to be relied upon for the purpose intended. We are not informed of the magnitude, or weight of the table upon which the apparatus rested; but assuming it to be susceptible of the communication of motion in the ordinary form of the experiment, it appears to us that so delicate an adjustment as is described is philosophically unsatisfactory for the purpose of discovering the effects of an involuntary mechanical pressure large enough to impart motion to a table. A lever of the kind employed, multiplying 46 times the space through which the extremity of the shorter arm is made to revolve, would exhibit an

extremely minute moving force exerted upon its shorter arm; and were a small force suspected, no doubt would be as convenient for exhibiting its presence as the torsion balance by which Coulomb discovered very small attractions. But it is not a question of a force so small in amount as to justify the recourse to such subtle means of observation. If the experimenter is pressing upon a stout card, laid upon a table, with a force unintentionally large, the friction between the card and the table will be equal to the measure of that pressure in pounds multiplied by the coefficient of friction between the two substances—a quantity discovered from experiment. Now, adopting the suspicions of Mr. Faraday, when the pressure is not vertical, but has a resultant inclined to the vertical line drawn through the point at which it acts, the moment that angle attains such a magnitude that its tangent becomes equal to the coefficient of friction, what is termed the "limiting angle of resistance" is attained, slipping immediately takes place, and in the arrangement under consideration the lever would be deflected. Supposing the experiment to be fairly tried, therefore, we are completely at a loss to reconcile all the circumstances which the professor has observed. To make good his view of the case, he must depend upon his instrument for showing; first, that the table-turner is really using a large pressure; and secondly, that that pressure has a sufficient resultant in the desired direction, to produce motion in that direction. If these conditions subsist simultaneously, a large amount of motion must be communicated to the card at the instant that the sight of the index checks the pressure exerted by the table-turner, and the table stops. In that case the result would be made evident by the cards moving upon the table, and carrying the lever with it. If they do not exist together, and motion take place in the table, that motion cannot be accounted for on merely physical principles. With regard to the small motions of the lever which he observes, obviously they are not of the smallest value as an indication of pressure. If the small action of the long arm indicate a resultant in any direction, that resultant must necessarily be so extremely minute that it may safely be referred to those inequalities of pressure which must be inevitably under the circumstances of the motion; and even the deflection of the lever through a considerable angle, it will easily be conceived, may be the result of a very small change in the direction of the resultant of a large pressure, supposed constant; or of a small change in the amount of the pressure, regarding the direction of the resultant as constant; or of a combination of both changes.

In some of his experiments the professor appears to have looked for results which no table-turner would have ventured to predict. Having produced motion in a card, or other object placed upon a table, he seems to have expected that the table should move too. This we believe not to fall within the scope of the anticipation of the generality of experimentalists on table-turning. In other of his experiments, he has rendered the lever the object in which motion should be expected; and motion having been produced in it, the reality of the phenomemon is vindicated; and when in one experiment motion ceased on the turner observing the index, the conditions of the experiment were falsified, for the will of the turner was no longer directed unreservedly to the motion of the table. The most ingenious arrangement of all appears to be that in which he employs two boards, separated by glass or metal rollers, and connected by elastic ligatures. So far, however, from this experiment being conclusive against table-moving, it really fortifies its reality. The upper board was made to move, and nothing more should have been expected.

If the fact of the motion being attributable to other than purely mechanical causes is to be negatived experimentally, there is a very obvious and very satisfactory means of doing it. One of them we may here take occasion to suggest. Motion having been produced in a table by table-movers, let it first be ascertained whether it be possible to turn it mechanically; and should it prove to be possible, it will then be high time to examine whether the turners have exercised that power unconsciously, or from a desire to impose upon the spectators. If a cord be passed a turn or two round the top of a table which has been moved, and one end be attached to some fixed point upon it, while the other is conducted over a pulley and made to support a scale-pan, nothing can be easier than to load the scale-pan with weights until the table is moved. The weight of the scale-pan and its contents will then represent the moving force requisite to produce motion in the mass. Now, if this weight be divided by the smallest number of persons who have succeeded in turning the table, the quotient will be the average of the resultants of pressure upon the table. According to Dr. Faraday, the gross sum itself will be the measure of the force; as one person has succeeded alone in producing the motion. The resultant being thus arrived at, however, it must be increased so as to represent the unresolved force which

each experimenter employs. Making the best allowance for this in our judgment, let the turner apply pressure to a dynamometric instrument by means of his fingers, until it indicates an amount equal to the unresolved force. It will then be perceived that it will be wholly impossible for the turners to exert that pressure without discovering to others that their fingers are in a state of tension essential to the communication of pressure. The cushions at the extremities of all the fingers under the pressure, compared with the position of the nail, would also be an indication of the same condition.

But we are able to say, from our own experience, and from that of others, that no such pressure is exerted. After having waited a quarter of an hour in a table experiment, we have been as conscious as at the moment we began that we were exerting no more pressure on the table than sufficed to produce contact, and we know that that has been the case with others who would only have been too glad to witness a failure, that they might laugh at what, in company with Mr. Faraday, they have been pleased to look upon as an easy credulity.

As we said at the outset, our object in recurring to this subject has merely been to preserve the investigation of phenomena which undoubtedly demand inquiry, and which promise to yield fruitful results, but the successful prosecution of which might suffer, as other subjects have suffered, from the pooh-poohing of great men. Of all our savants, we cannot avoid expressing our surprise that Mr. Faraday should have been the first to denounce table-turning as a deception. In his industrious career of experimental research, how often has he been led to results which startled him at the moment of their discovery, and of which, at the present day, neither he nor any man can explain the rationale. He has not discredited the phenomena of electro-magnetism, of electricity induced magnetically, of the polarisation of light, of the magnetisation of the ray, of magneto-crystalline action, and of many other brilliant discoveries in science, the discovery or illustration of which have added to his fame; why then has he not shown a little more patience, considering the frailty of the most powerful human judgment, in dealing with a phenomenon as concealed from us in its nature as any of these, but the truth of which has been established in an infinite number of successful experiments performed in every part of the world. It may be, however, that the ideas of physical philosophy which, in a long course of research, he has been brought himself to entertain, may alone have induced him to reject table-turning altogether. Minds long accustomed to a peculiar course of training receive with difficulty impressions which appear to revolt against principles regarded as rigidly fixed. When Harvey announced his theory of the circulation of the blood, not one physician of over 40 years of age admitted it; and so it has been in other instances—probably in the present one. Let us hope, however, that the subject will continue to receive the attention it deserves, and that, in the course of investigations, which perhaps may have a long continuance, Mr. Faraday, who has done so much in the establishment of new principles, may one day not only admit the reality of table-turning, but connect its phenomena with others that are recognised, and place them on the same footing in the sciences.

SORRELL'S PATENT SMOKE-CONSUMING FURNACE.

(Patent dated December 11, 1852.)

The patentee of this invention promotes a more complete combustion of the fuel in a furnace, or fire-place, and consequently does away with its hot carbonaceous products, by causing the smoke to be drawn from the chimney or shaft of the fire-place, or furnace, then mixing it with atmospheric air, and in that state making it pass through or over the fire, when the oxygen of the air will enable the carbonaceous and other inflammable constituents of the smoke to be consumed. In the second portion of his patent he describes a mode of forming the bottom of the furnace by an arrangement of fixed fire-bars with a system of cam-edged discs and tappets working between them, which break up and clear the fire, and facilitate the perfect combustion of the volatile portions of the fuel. This latter arrangement will be comprehended from the accompanying figures:

Fig. 1 of the accompanying engravings is a longitudinal section of a steam-boiler furnace, constructed with Mr. Sorrell's moving fire-bars. Fig. 2 is a plan in section; fig. 3, a cross-section through the fire-bars; and fig. 4, a front elevation of the boiler, and arrangements for giving the fire-bars the necessary motion. Fig. 5 shows a detached view of the gearing, by which the fire-bars are worked. The boiler shown is a single-flue boiler; but the same arrangement of fire-bars may obviously be adopted with double-flued and other similar constructions of boiler. *a* is the body of the boiler; *b*, the feed-hopper; *c*, a feed-roller in the hopper, for causing the coals to be supplied regularly to the fire. *n n* are fire-bars, of the ordinary form, between which are placed revolving discs, *k k*,

mounted on cross shafts, *d d*. These discs are of the form shown in fig. 5, and placed at such a level that the tappets or projections formed in them come a little above the upper surface of the fixed bars, *n n*; *l l*, are rockers or tumblers mounted on other cross shafts, *e e*, and placed so as to occupy the spaces between the discs, but without interfering with their revolution. Motion is given to the discs, *k k*, by means of the pawls or clicks, *f f*, mounted in the links, *g g*, which are suspended from the cross-shafts, *d d*, and connected at their lower ends to the bar, *h*, the pawls, *f f*, taking into ratchet-wheels, *i i*, on the ends of the cross-shafts, *d d*, on which the discs are mounted. A grooved bar covers the series of ratchet-wheels and preserves them from the action of the fire. The bar, *h*, is connected at one end by a link or rod, to an arm projecting from the shaft, *j*, which has another arm at right angles to the former, connected by a rod, or link, to a crank pin in the side of a ratchet-wheel, *m*, which is set in motion by a click or pawl, attached to the end of a rod moved by an eccentric driven from a steam engine, or other power, which also gives motion to the feed-wheel in the hopper. The effect of the step-by-step revolving motion given to the discs, *k k*, and the rocking action of the tumblers, *l l*, is to break up the fire, and thus cause the smoke and air admitted, or forced into the ash-pit, to pass more readily through it. The air entering the ash-pit passes also to the back of the fire, and rises in front of the bridge, *o*, in the space left at the inner end of the fire-bars, where

Fig. 1.

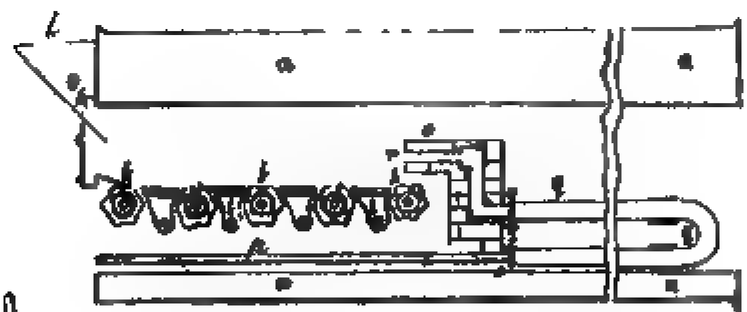


Fig. 3.

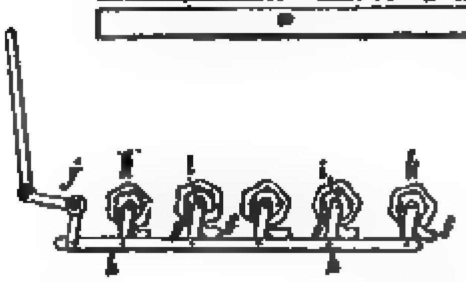
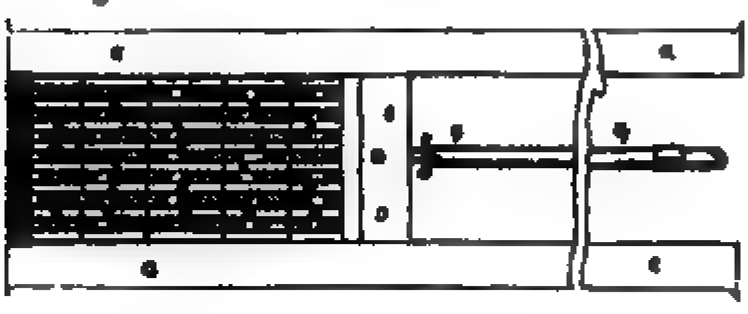


Fig. 5.

Fig. 4.

Fig. 2.



it meets the smoke passing towards the bridge, and becoming mixed with it causes it to be consumed; the effect of the air thus entering the furnace may be increased by admitting water through the pipe, *p*, into the pipe, *q*, where it becomes converted into steam, which issues through an aperture, *r*, in the bridge into the furnace. The patentee also suggests that the admission of air, &c., to the fire for the purpose of consuming the smoke, may be effected by fitting the furnace or fire-place with fire-bars of the ordinary form, and with a row of revolving discs of the form before mentioned, at the inner end immediately under the bridge, so as to keep a clear space at the back of the bars to admit air through the fire.

TRIAL OF THE BOOMERANG PROPELLER.

Another trial of Sir Thomas Mitchell's boomerang propeller took place on Monday morning last on board H.M.S. *Conflict*, under the command of Captain W. H. Henderson, C.B., of H.M.S. *Blenheim*, Portsmouth. The *Conflict* left harbour at 9 A.M. for the measured mile in Stoke's Bay, when the average result of six runs was 9·378 knots—an improvement of about two-thirds of a knot on the speed attainable with the *Conflict's* own propeller. The average revolutions were 65½.

This trial with the boomerang was made in order to test the action of the blades, after the two small continuations which Sir Thomas Mitchell had been induced to make had been taken off, and the propeller reduced to its original shape and proportions. The result has been a gain of two-thirds of a knot, which nautical men consider a great deal with so heavy a ship as the *Conflict*; and we understand that Sir Thomas Mitchell means to challenge Griffith's propeller to do as much with the same ship.

The general result of the trials to which the boomerang has been subjected seem to establish its claims to public favour. In point of celerity Sir Thomas Mitchell has proved the efficiency of his boomerang in a very heavy vessel, and that efficiency will be more palpably manifest if his offer to fit one to Her Majesty's yacht the *Fairy* is accepted. In other points not so striking to superficial observers, perhaps, as celerity, but not less intrinsically important, namely, the diminished wear and tear of ships and the economy of fuel, the superiority of the boomerang is decided. We alluded to the absence of vibration in the trial we last reported; and on this occasion, in the midships of the vessel and below, while the *Conflict* was making nearly 10 knots, vibration could be perceived. The enterprising merchants of Liverpool have shown themselves sensible of the economical advantages of the boomerang, and have already fitted it to several of their ships, which have accomplished quick voyages with a much diminished expenditure, as already noticed. The propeller used on board the *Conflict* was manufactured by Taylor and Co., of Birkenhead, and Sir Thomas Mitchell pronounced an emphatic eulogium on the skill of their workmen, and their ready appreciation of the principle of his invention, or rather his ingenious application of the principle of the rude Australian weapon to the purposes of propulsion. The leading and the following blades of the boomerang propeller may be likened to the dorsal and caudal fins of fishes when swimming, act on water at similar angles, and are rooted on the shaft on the same principle of strength as those fins are attached to the fish's body, imparting the power which is to give it motion. To give the boomerang propeller full space to develop its powers, larger apertures are requisite than are now generally found in either ships of the royal navy or in merchant vessels. The full boomerang propeller requires, we are informed, a space in length equal to one-third of the height. This alteration can, however, be easily effected.

THE LONDON DEPOT FOR ALLSOPP'S BURTON ALES.

Within the short space of twelve months, the once quiet neighbourhood of Haydon-square, Minories, has been converted into one of the most active foci of trade in the whole metropolis. It is now the goods terminus of the London and North-Western Railway Company; and, dating from Wednesday last, it has become the terminus of 140 miles of railway, upon which the enormous produce of Messrs. Allsopp's brewery, at Burton-upon-Trent, is conveyed to their extensive depôt for the supply of the metropolis. Chaplin and Horne, and Pickford and Co., also, have establishments in the same place. The mechanical arrangements by which so vast an amount of business is done, are of the most extensive and interesting character; and as regards the Messrs. Allsopp and Son, they are absolutely necessary to meet the requirements of the traffic which is the result of the increasing taste for their ales. The engineering work necessary for the purpose has been gigantic in extent, and costly in its details. In the first place, a branch of the Blackwall Railway has been laid down from the vicinity of the Minories station to the building in which the Messrs. Allsopp carry on their business, and this branch completes the communication with Burton, through Camden Town and Bow. One of the large and substantial warehouses of the East India Company, in Haydon-square, has been converted to their use, while new ones have been added. Messrs. Allsopp's premises have an extreme length of 364 feet, and an extreme width of 105 feet; and this large space consists mostly of cellarage, though a very considerable extent of store is on the ground floor. By the system of intercommunicating railways to which we have adverted, ale sent from the brewery at Burton on any afternoon is delivered on the premises of Messrs. Allsopp, in Haydon-square, by 7 o'clock on the following morning, the train which conveys it actually entering their premises

by the branch line and its subsidiary arrangements, and, from this depôt, it is distributed in London. Of the immensity of work, and the outlay of money which has been needed for this purpose, no description can give anything like an adequate idea. The massive East India storehouse had to be adapted to the reception of the rails at a level which brought them in on one of the high floors. This work was admirably managed by Mr. Baker, the engineer, who displayed great ingenuity in cutting the apertures in the walls for the passage of the trains, and the turning of the arches, by which the superincumbent masonry was to be supported. All this has been successfully accomplished by him, by first cutting away from the walls only enough to turn the arch in, then turning the arch, and afterwards removing the masonry beneath. Entering the huge buildings thus converted to the incidents of railway traffic by the large apertures which admit it within their walls, we find ourselves involved in a labyrinth of railway machinery, by which they are capable of being traversed in all directions, with space between each pair of tramways for a platform, or for two wagons to load abreast of one another. At all the intersections of the lines which the form of the building renders necessary, are turn-tables, which enable any part of the building to receive a truck or train of trucks. The floors beneath are similarly supplied with railways and turntables, and communication is effected between floor and floor by means of moveable platforms, also laid with rails. A carriage is raised from one floor to that above it by hydraulic pressure, which is supplied by the company. The porter attending to the platform has only to pull a lever, which, effecting a communication between the water under pressure and a cylinder fitted with a tight solid plunger, carrying the platform, instantly lifts it to the floor above, when it is moved upon the rails of that floor to its destination.

These moveable platforms, and the cranes, or lifts, in the Messrs. Allsopp's premises, and in all these buildings, are on the same hydraulic principle—that of Armstrong's patent—and are productive of a great economy of labour. These arrangements, in the present infancy of the business of the depôt, are sufficient for disposing easily of 300 and 400 barrels at a time, or of 2,000 tons each week. Before long they will be extended to Aldgate, when they will be in a condition of increased efficiency for the growing requirements of the trade. Messrs. Allsopp have also a fine export establishment at Poplar, adjacent to that of Mr. Bass, and standing on an area of 20,000 square feet. This building communicates also with the London and North-western Railway, through Camden Town, and the Blackwall establishment, standing on 25,000 feet of ground, and situated at Bow Creek, communicates with the Eastern Counties Railway. The Haydon-square terminus has an area of site amounting to 20,000 square feet. It is impossible to give anything like an idea of the number of barrels of ale in store here; but immense as it is, it forms only a third part of the whole stock in London, and is sufficient, at present, for no more than two months' consumption.

The Swelly Rocks.—The removal by blasting of the Swelly Rocks, situated in the centre of the Menai Straits, will take place during the course of the present summer. The Lords of the Admiralty have adopted the plan proposed by Mr. Edwin Clarke, the engineer, and the contractors have received directions to proceed without delay with the work of removal, the time for which has been limited to 18 months. The chief portion, it is expected, will be removed during the present season. The cost will be about £6,000, for which a parliamentary grant has been obtained, and this will insure the removal of the principal obstructions, with a considerable portion from the surface of the quarter tide rocks, thus leaving the important navigation of the Straits comparatively unimpeded. The removal of these obstructions will scour the bed and channel of the Straits, and considerably improve the bar harbours of Beaumaris and Carnarvon, and cause the transit of many vessels through the Menai, in preference to the longer route by Holyhead.

THE IRON TRADE.

At the preliminary meeting of the South Staffordshire and Shropshire ironmasters, held at Stewponey on Friday last, it was unanimously agreed to reduce the price of manufactured iron 20s. per ton. The prices fixed upon were as follows:—Sheets and plates £12; hoops £10; and bars £9; consequently, the price of hot blast mine pigs will be about £4, and cold, £4 10s. They may in some instances be bought at a lower price. One house, which some few weeks ago gave £5 5s. for pigs, has within the last ten days purchased 100 tons at £3 15s. From the statements made by persons extensively connected and intimately acquainted with the iron manufacture of this district, who attended the meeting, there is every reason to anticipate with confidence a good trade for some

months to come. It was represented that there are several large orders in England held back in expectation of a fall in price, and that this gave a degree of firmness to the resolution of the trade. Home stocks are unusually small; they were never known to be smaller, and those in the ports of the United States unusually so. The latest accounts received here allude to the lowness of stocks in the market, and the probable demand upon the British makers. There have, it is said, been few orders from America of late; and it is conjectured—an inference drawn from former experience—that there also a contemplated reduction in price has induced purchasers to hold off, and that consequently there will be an accumulation of orders from across the Atlantic. It is satisfactory to state that, at the preliminary meeting to which we have referred, the question of labour and its remuneration was discussed. There seemed to be no disposition to interfere with wages at present.

Glasgow Pig-Iron Market.—Glasgow, July 2.—Throughout this week the pig-iron market has been much affected by the nature of Eastern rumours; the price has ruled about 53s., at which there was business done yesterday, but to-day the demand has been damped by the warlike intelligence from Russia, and holders gladly quitted at 6d. reduction. The market closed heavily at 52s. 6d. cash; buyers at 52s.; No 1, 53s. 6d.; Glengarnock, 56s.; Gartsherrie, 57s. to 57s. 6d.

America.—By the Royal Mail steam-ship, *Canada*, which arrived at Liverpool on Sunday, with advices from New York to the 21st ult., and from Boston to the 22nd, we learn that Scotch pig-iron was selling at 28 to 29 dollars cash, and 30 to 31 dollars, six months.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

WILLIAM KEATES, of the firm of Newton, Keates, and Co., of Liverpool, Lancaster. *Improvements in fire-boxes for locomotive and other steam-boilers.* Patent dated December 3, 1852. (No. 955.)

Mr. Keates' improvements consist in constructing fire-boxes for steam boilers from cast or wrought plates of brass, or of other alloys of copper with zinc or tin, or with both. The alloy of zinc and copper preferred when wrought plates are used, is 63 parts of zinc to 100 of copper; when cast plates are used, 45 zinc to 100 copper. That of tin and copper preferred for wrought plates is 3½ tin to 100 copper; and for cast plates 10 tin to 100 copper. The proportions just given are those that should exist in the manufactured alloys.

The inventor recommends that the cakes should be cast at least three times the thickness of the required plate, as the fibre of the alloy is much improved by rolling or forging; and as it is needful to keep them at a red heat during these processes, he also advises that the rolls or anvils employed be heated.

Claims.—1. The use of alloys of copper with zinc or tin, or with zinc and tin, for the construction of fire-boxes for locomotive and other steam boilers, as described.

2. The rolling or forging of such alloys on heated rolls or anvils, and the flanging or bending of the same on heated blocks, moulds, or forms.

JOHN COPLING, junior, of the Grove, Hackney, Esq. *A safeguard railway signal.* Patent dated Dec 29, 1852.—(No. 1186.)

The object of this invention is to enable communication to be effected between the guard and engine-driver of a railway train, and from any passenger to the guard or engine-driver. For this purpose a moveable drum or reel is suspended by brackets in the guard's break-van at the rear of the train, from which is uncoiled a cord of wire, which is passed forward over the roof of the carriages through a series of snatch pulleys swivelled on standards, and of which there may be one or more to each carriage, rising about 40 inches above the roof. The cord thus extended above the whole train is attached to the handle of a spring or other bell on the engine or tender, or to the handle of a crank fitted to the steam whistle belonging to the engine, and the bight of the rearmost end of the cord near the reel is hitched on to the pulling-handle of a spring or other bell in the guard box. Above each carriage roof, about the centre, is a swivelled spring-hook for connecting with the main cord three branch cords, one of which is led into each compartment of the carriage through the roof or ventilator, and the end made fast inside. By pulling any one of these branch cords in one direction, the bell in the guard's box will be sounded; but if pulled in the opposite direction, or if the main cord be pulled by the guard, it will sound the bell on the engine or tender, or draw down the handle of the whistle, when the steam may be shut off; and if the signal be enforced by waving a flag or lantern, to be provided in each carriage, the guard will put on the breaks and stop the train quickly, or more gradually, as the urgency of the case may require.

This is the simplest arrangement of this signal; but Mr. Copling describes also other modes of communication by similar means, on a more extended scale.

Claim.—The arranging and combining apparatus, as above described, so as to constitute a means of communication between the passengers, guards, and engine driver in a railway train.

JOHN WHICHCORD, the younger, and SAMUEL EGAN ROSSER, of Great Russell-street, Middlesex, civil engineers. *Certain improvements in the mode of burning and applying gas for light and heat.* Patent dated December 29, 1852. (No. 1188.)

This invention consists; firstly, in an improvement in the mode of burning and applying gas for lighting. This is effected by the introduction of a ventilating bell and tube, placed in a convenient and suitable position above the gas-burner. These are made with a trough or channel, to receive the condensation of any aqueous vapours arising from the combustion of the gases; the said trough or channel being so placed that the aqueous products can either be carried away by a pipe (or other means), or become evaporated, and driven off through the chimney when the gas is burning.

Secondly. In effecting such an arrangement of the globes, glasses, and chimneys of gas-burners, as to introduce a current of cold air between the outer surface of the ventilating bell or glass, and the interior of the globe which encloses the gas-burner; and also a second current between the external surface of the gas-chimney and the inner surface of the ventilating glass or bell. In this arrangement the pendent glass or bell above the burner dips down below the mouth of the surrounding globe, and at the same time descends externally below the upper orifice of the chimney of the gas-burner. By this means the atmospheric air, which can only enter at the top of the globe, is made to descend between the inner surface of the globe and the outer surface of the bell, and then to pass up between the outer surface of the chimney and the inner surface of the pendent bell, carrying with it the whole of the products of the combustion of the gas up the ventilating tube.

Thirdly, in an improved mode of applying gas for heating purposes. The gas-burner of a stove is, in this case, placed within or under a tube or casing for conveying the heat through a chamber surrounded with water or other fluid. This tube or casing is made with a trough or channel placed in a suitable position for conveying off the condensed aqueous vapours that may be formed inside the chamber by the combustion of the gases, and is so placed, that the aqueous products can be either carried away by a pipe (or other means), or become again evaporated and carried up through the chimney. The tube or casing may be made similar to the worm of a still or refrigerator, and have its end turned down to carry the aqueous products off into a vessel placed to receive them.

WILLIAM EDWARD NEWTON, of Chancery-lane, Middlesex, civil engineer. *Improvements in the manufacture of carpets.* (A communication.) Patent dated December 29, 1852. (No. 1191.)

The *first* branch of this invention relates to the manufacture of three ply and two ply printed carpets. The improved fabric or carpet produced according to the invention is made by the process of ingraining or weaving together uncoloured warps and wefts in "plys" (whether two or more plys be ingrained), and subsequently printing the figures in colours on one or both surfaces of the cloth. The figures may be the same on both sides, or a figure of one kind, and composed of any colours, may be stamped on one side, while a figure of an entirely different kind, and having different colours, may be stamped or printed on the opposite side, as the manner in which the cloth is woven operates to prevent the colours imprinted on the external surface of one of the plys or layers from striking into and through the other ply or layer, so as to appear on its surface.

The *second* branch of the invention relates to the manufacture of single ply printed carpets. In this case the inventor takes stout cotton or other twine for the warp, which is stretched tightly in the loom so as just to yield sufficiently to allow of the motion of the heddles; over this is then thrown uncoloured woollen filling, when the carpet is to be printed on one or both sides; or a light-coloured filling may be used, and the pattern printed on it in heavier colours. The filling is beat up hard over the stretched warps, which are thus entirely concealed from view, while they serve to prevent the passage of the colouring matter from one side to the other of the carpet. The printing is then performed on one or both sides, and in any variety of colour and design according to taste.

Claims.—1. An ingrained plyed printed carpet made by a combination of the processes of weaving in two or more plys, and ingraining the same, and subsequently printing the figure or figures on both sides of the same as described.

2. A single ply carpet woven as above described, and printed upon one or both sides in manner set forth.

ARCHIBALD DOUGLAS BROWN, of Glasgow, cabinet-maker. *Improvements in the construction of portable articles of furniture.* Patent dated December 29, 1852. (No. 1192.)

This invention consists in so constructing chairs and other articles of furniture that they may be packed in separate pieces within small compass for easy stowage. The plan adopted for this purpose, in the case of chairs, consists in the adaptation of wedge or dovetailed joints, or modifications thereof in metal, to the junction ends of the seat-frame and tops of the legs, the socket being on one piece, and the corresponding projection on the other, so that a firm joint connection is easily made by slipping the corresponding surfaces into gear. The same arrangement is obviously adapted for connecting the parts of other articles of furniture, such as wash-stands, toilet-tables, stools, &c.

Claims.—1. The general arrangement and construction of articles of furniture as described.

2. The system or mode of connecting together the several parts of chairs and other articles of furniture by the use of wedge dovetail joint pieces.

3. The system or mode of connecting the details of chairs and other articles of furniture by means of wedge dovetail pieces sunk or recessed in the wood or material of the furniture.

4. The application and use of differentially slotted dovetail connections for the purposes described.

James Edgar Cook, of Greenock, Renfrew, booking clerk. *An improved composition for the prevention of the decay and fouling of ships' bottoms and other exposed surfaces.* Patent dated December 29, 1852. (No. 1194.)

This "improved composition" or varnish is made up of the following ingredients:—Shell lac, seed lac, gamboge, gum arabic, gum benzoin, red lead, white oxide of zinc, and French verdigris, mixed together and dissolved in spirits of wine or wood spirit at a strength of about 60° above proof. The proportions preferred are, shell lac, 2lbs.; seed lac, ½lb.; gamboge, ¼lb.; gum arabic, ¼lb.; gum benzoin, ¼lb.; red lead, 1lb.; and spirits of wine or wood spirit, 1 gallon. The gums are first dissolved in the spirits, and the red lead added by degrees. The composition is applied with a brush, the surface to be covered having been previously well cleansed, and when dry a second coating is laid on and allowed to harden. The surface so covered is then brushed over with a second composition similar to that before described, with the addition of 1½lb. of white oxide of lead, and 1½lb. of French verdigris, the latter of which is separately dissolved in spirits of wine, and mixed with the other ingredients, when the red lead and oxide of zinc are added. Two coatings of this second composition are laid on to the previously treated surface, and this completes the operation.

The patentee does not confine himself to the proportions mentioned, but claims,—the application and use of the composition substantially as described for the coating and preservation of exposed surfaces.

James Power, of Paris. *Silvering all sorts of metals and of glass.* Patent dated December 29, 1852. (No. 1196.)

The patentee's process is performed as follows:—He takes one ounce of crystallised nitrate of silver, dissolves it in twice its weight of distilled water, and adds 9½ per cent. by weight of nitrate of liquid ammonia. He then adds six times the weight of the nitrate of silver, of spirits of wine, agitates the liquid, and adds 15 per cent. on the whole volume, of resinous spirit (composed of one part of resinous matter by preference, gum galbanum, to five parts of spirits of wine). The liquid is then left to settle, and filtered, after which it has added to it nine times its quantity of spirits of wine, with the further introduction of 8 per cent. of liquid ammonia, and a quantity of spirits of wine equal to its whole volume. The solution will then contain about 5 parts nitrate of silver to 1,000 parts of liquid. The liquid thus prepared and filtered may be used immediately in connection with a galvanic battery, in the manner usually practised by platers, but it is better to let it remain quiescent for some time. The anode or thin sheet of silver in connection with the positive pole acts perfectly in this liquid, and gradually dissolves in the bath; the deposition commences immediately on the objects to be plated being introduced into the bath, in a white and brilliant form, and the thickness of coating can be regulated at pleasure. To ensure its more perfect adhesion, in certain cases the metals may be first passed through a solution of nitrate of mercury. When glass is the material to be coated, a thin film of silver is previously formed on it, by adding to the liquid a few drops of spirits of cloves in a separate bath, and the quantity of ammonia used in preparing the bath is only from 2 to 8 per cent. By precipitating copper on the silvered glass, and then detaching the two metals, plates may be produced suitable for daguerreotypic or photographic purposes.

Claim.—The silvering of all metals and glass by the aid of certain compounds, and especially resinous matters combined with the use of metallic salts, and put into contact with galvanic or electric action in the usual way; the use of all resins, resinous gums, resinous fluids and balms, and all resinous matters or compounds whatsoever; and further, the production of electro-

chemical plates of a single casting upon glass, crystal, porcelain, and all other earthy or other substances not metallic, susceptible of receiving a perfect polish.

AUGUSTE EDOUARD LORADOUX BELLFORD, of Castle-street, Holborn. *For certain improvements in machinery for grinding and reducing gold quartz to an impalpable powder, and amalgamating the said ground quartz with quicksilver, the same being applicable also to the pulverizing and washing of ores.* (A communication.) Patent dated December 29, 1852. (No. 1197).

The claim in this case is sufficiently explicit to make the nature of the invention readily understood. The drawings show a set of stampers, of the usual form and worked in the common manner, placed on an elevation above the pulverizing and amalgamating basins for the purpose of reducing the quartz previous to its passing to these latter. The *claim* is for the employment, for the purpose of reducing gold quartz to an impalpable powder, of any number of basins and balls constructed, arranged and operating as described; to wit, the basins being concave and placed in an inclined position and having rotary motion; and the balls being placed loosely one in each basin, receiving rotary motion in the opposite direction to the basins containing them, by means of the contact of their surfaces.

THOMAS WALKER, of Birmingham. *Improvements in apparatus for regulating the speed of steam engines.* Patent dated December 30, 1852. (No. 1199).

This invention relates to means of arranging and combining apparatus to be worked by the steam engine, by which the excess of pressure or exhaustion of air is caused to act upon the throttle-valve, and thus regulate the supply of steam.

The patentee disclaims all novelty in the general principle of his invention, but suggests that from various causes the principle has not been hitherto used to the same advantage as in the apparatus of which he supplies a descriptive drawing.

THOMAS WALKER, of Birmingham, Warwick. *Improvements in apparatus for regulating the dampers of steam boiler and other evaporating furnaces, which apparatus is also applicable for indicating the pressure of steam or other fluids.* Patent dated December 30, 1852. (No. 1200.)

This invention consists in causing the pressure of steam from a steam-boiler or other evaporating furnace, to act in a cylinder upon a piston, weighted so that it is caused to traverse in the cylinder only as the pressure of the steam increases, and in that traverse to act upon the damper to regulate the draft through the furnace and its consequent evaporating effect, and also to cause the pressure of steam or of other fluid for the time being exerted to be indicated.

The apparatus may be adapted to perform both these duties at the same time, or it may be employed simply as a pressure indicator.

Claim.—The means described for actuating the dampers of steam boiler and other evaporating furnaces, and also the application of the apparatus to indicate pressure of steam or other fluids.

HENRY HUTCHINSON, of Sheffield, York, book-keeper. *Improvements in machines for washing bottles.* Patent dated December 30, 1852. (No. 1201.)

Mr. Hutchinson's improvements consist in the employment of adjustable frames for holding the bottles to be washed, which frames are mounted in pairs so as to form a balance to each other, on an axis to which motion is imparted, in order to give to the frames carrying the bottles a vibratory or semi-rotary motion. The frames can be adjusted to suit various-sized bottles, such as quarts, pints, &c. The bottles when in the frames are brought up against india-rubber stoppers, which enter their necks and hold them firmly in place, at the same time that they prevent the escape of the water and shot or other cleansing agent placed inside them during the process. Six or more frames may be mounted on the same axis when large numbers of bottles are to be cleansed, provided always they are so placed as to balance each other when in motion.

Claim.—The arrangement and combination of machinery or apparatus for cleansing and washing bottles as before described.

JAMES WARD, trussmaker, and WILLIAM BURMAN, brickmaker, both of Stratford-on-Avon, Warwick. *Certain improvements in machinery for making bricks and tiles.* Patent dated December 30, 1852. (No. 1202.)

This invention consists in certain arrangements of machinery by which a sliding-table with a supply of clay is caused to present itself under a hollow die or mould, which die, or mould, on descending, receives the clay within it, and is then caused to ascend until it comes in contact with a plunger, which forces out the partially-made brick or tile from the mould on to another portion of the table, which then recedes with its load, and at the same time brings forward on its further end a fresh supply of clay.

Claim.—1. The hollow die or plunger working as described.

2. The combination of a hollow die and plunger with the feed and delivery-table caused to work simultaneously and uninterruptedly as described.

ROBERT STEPHEN OLIVER, of the city of Edinburgh, Scotland, clothier and hatter. *Certain improvements in waterproof and other*

garments. Patent dated December 30, 1852. (No. 1203.)

These are intended to provide the means of ventilating such garments, by allowing the heated air to escape from them, and fresh air to enter into and pass through them while on the body of the wearer, at the same time affording elasticity and adaptability to the movements of the body, while wet is excluded. This object is accomplished,—firstly, by means of flat tubes or passages composed of waterproof cloth or other suitable material, adapted and applied to different parts of the body,—secondly, by openings made in various parts of the garments, which holes are covered by insertions of elastic India-rubber cloth perforated, or of knitted or netted work,—thirdly, by means of openings in the seams of garments.

JULIUS SINGER, of Mabledon-place, Burton-crescent, Middlesex, tailor. *Improvements in wearing apparel.* Patent dated December 30, 1852. (1204).

This invention is intended to supersede the use of braces for supporting trousers, &c. For these, straps attached to, and forming parts of the shirt, are substituted, by which the wear of the shirt, produced by the friction of the braces, is avoided. Other advantages of this invention are, that the shirt-front is confined to the breast, and is therefore made to fit better, and also that the inconvenience arising from the slipping of the ordinary brace from the shoulder is not felt.

Claim.—The manufacture of shirts with suspending straps attached thereto, as above described. And, also, fitting trousers or nether garments with suitable attachments for receiving the ends of the straps.

ROBERT TAYLERSON, of Three Indian Kings-court, Newcastle-upon-Tyne. *Improvements in shipbuilding.* Patent dated December 30, 1852. (No. 1206).

These improvements have relation to iron ships, and in carrying them into effect, in place of having the main irons or ribs vertical and parallel, as heretofore, some of the ribs are vertical and parallel, and have combined with them other ribs, which are diagonal; the plates used for plating such vessels are cut with diagonal ends, in place of right-angle ends, and in order that the doubling or connecting pieces may offer equal strength in all directions, the plates from which they are made are rolled in opposite directions; the keel and keelson are each constructed of two trough irons, face to face, connected on the upper and under sides by plates and rivets; the water-tight bulk-heads, in place of being fixed to the ribs as heretofore, are fixed to T-iron, such T-iron having on either side strong timbers, which are fixed to the T-iron and plates by screw bolts and nuts passing through them; and the deck beams, in place of crossing at right angles, cross diagonally, and they also cross each other. In other respects the ordinary modes of construction are adopted.

Claim.—The combined means of constructing iron ships herein described.

THOMAS BENJAMIN SMITH, of Bristol. *Improvements in calcining certain ores, and in the construction of furnaces for that purpose; and for converting certain products arising in the process into an article of commerce, not heretofore produced therefrom.* Patent dated December 31, 1852. (No. 1209).

This invention has reference more particularly to the first operation in smelting sulphuret copper, and other ores; namely, their calcination, by which a portion of the sulphur is expelled, and the metals they contain are oxidized. The inventor proposes to avoid the inconvenience and injury of the ordinary process caused by allowing the free vapours to pass into the open air; and, by condensing the metals which are evolved in the process in flues or pipes, to use the sulphurous vapours for the manufacture of sulphuric acid. For these purposes he uses nearly-closed chambers, furnaces, or retorts, which are heated from without, and by passing heated air into these he does not admit the products of combustion from the fire to mix with the vapours or gases evolved in the process of calcination, as such products would render these vapours unfit for the manufacture of sulphuric acid. With the chamber, furnace, or retort employed he connects suitable flues or pipes, to carry away the vapours, in which he condenses the volatilised metals, while the sulphurous vapours are carried away to suitable chambers, and proceeded with in the ordinary manner of obtaining sulphuric acid from them.

When sulphuric acid is not needed, the process of calcination may be much facilitated, by introducing a much larger quantity of air, which will be an advantage to the smelters.

The inventor also proposes to use a portion of heated oxygenated air at times, to assist the calcination of metallic ores.

Claims.—1. The improved plan of constructing a calcining furnace as before described.

2. The improved mode of calcining, whether the manufacture of sulphuric acid be combined therewith, or not, as described.

3. The use of heated air blown into, or on to the ore in the chamber, furnace, or retort, whereby the calcination of the ore is much facilitated.

4. The manufacture of sulphuric acid

from the sulphurous acid obtained in and by the process of calcination.

James Lord, of the Inner Temple, barrister-at-law. *Improvements in carriage steps.* Patent dated December 31, 1852. (No. 1211.)

The steps of the carriage are, in this invention, attached to the nave of the wheel by means of a hoop in such a manner that they do not alter their position when the wheels revolve.

William Wilkinson, of Nottingham, frame-work knitter. *Improvements in taps and other apparatus for filtering and drawing off liquids.* Patent dated January 1, 1853. (No. 1.)

This invention consists in manufacturing cocks, taps, and other similar apparatus, of glass (or of a combination of metal and glass), these being either moulded or blown; also, in certain methods for admitting air into casks, and in an improved filtering vessel composed of wood and glass. The filtering vessel is composed of a percolated cylinder, fitted on the interior with several perforated transverse discs, which are covered with linen, or some similar substance.

Claims.—1. The construction of cocks, taps, &c., of glass, or of a combination of metal and glass.

2. The arrangement for admitting air into the interior of casks or barrels.

3. The filtering apparatus above described.

Joseph John William Watson, of Old Kent-road, Surrey, doctor of philosophy, and William Prosser, of Adam-street, Adelphi, Middlesex, gentleman. *An improved method of manufacturing steel and of carburizing iron.* Patent dated January 1, 1853. (No. 5.)

This invention consists, *first*, in the use of electricity in producing carburization in soft iron to form steel and carburized iron; and *second*, in using sulphate of manganese (preferably the waste sulphate from the chloride of lime stills), with carbonaceous matter and lime, to form steel either with or without the use of an electric current.

The modes of applying the electrical agent, and of using the sulphate of manganese, will be readily gathered from the claims, which are as follows:

Claims.—1. The use of electricity in producing carburization in soft iron to form steel and carburized iron.

2. The application of an electric current to a molten mass of cast iron in the presence of carbonaceous matter, in the manner and for the purposes described.

3. The use of an electric current to form steel, by applying the current to bars of soft iron imbedded in charcoal or other carbonaceous matter, in the ordinary converting-troughs, and disposed as in the manner ordinarily practised in steel manufactories, in the manner and for the purposes described.

4. The making of the converting or cementing-troughs non-conductors of electricity, in the manner described.

5. The application of an electric current to the production of steel and carburized iron, by applying the current to the charcoal or carbonaceous matter in which the bars to be steeled are imbedded, in the manner and for the purposes described.

6. The application of an electric current to the production of steel and carburized iron, by applying the current to a suitably-constructed vessel or furnace of good conducting power and well insulated, containing a mass of melted cast iron.

7. The use of graphite or any other form of carbon as electrodes, for conducting the current of electricity in the manufacture of steel, in the processes hereinbefore described.

8. The use of sulphate of manganese with carbonaceous matter and lime, to form steel and carburized iron, either with or without the application of an electric current, in the manner and for the purposes hereinbefore described.

Thomas Billyeald, of Ison-green, Lenton, Nottingham, and of Albert-street, Nottingham, lace-manufacturer. *An improvement in the apparatus and arrangement of apparatus for making looped fabrics.* Patent dated January 1, 1853. (No. 6.)

This invention consists in adopting, in place of the ordinary needle used in machinery for making looped fabrics, an instrument with a short hook, and a supplemental instrument to act in connection therewith, upon which the work rests while the laying or lapping takes place close up to the hook, the length of loop being regulated, as heretofore when ordinary needles are used, by sinkers. The bringing forward of the work for knocking over then takes place by the coming forward of the sinkers as heretofore, and the additional instruments upon which the work has been resting now have movement given them to conduct the work over the tops of the small hooks, and on to the new loops.

The claim is for instruments constructed, arranged, and worked as above described, in substitution of the ordinary barbed needles employed in the manufacture of looped fabrics.

Joseph Brough, of Longton, Staffordshire. *A new manufacture of a vitrified substance, and its application alone, or in combination with mineral, earthy, and plastic*

substances, to various purposes in the arts, and for certain other new applications of known plastic substances. Patent dated January 1, 1853. (No. 7.)

This invention consists—

1. In the formation of a new compound substance, which the inventor proposes to call "opaline." It is formed by melting and mixing ground porcelain (or instead of that, a portion of the materials which enter into the composition of porcelain, china, parian, or earthenware) with a suitable quantity of glass or any fusible minerals, or salts, such as potash and pearlash soda, &c. If it is intended to be very dense and opaque, a larger portion of earths, clays, and minerals are used; but if it is intended to be more transparent and lustrous, a larger portion of the salts, alkalies, or glass is used. To give colour to the opaline, stains or colours, prepared from the metallic oxides, similar to those employed by the porcelain manufacturers, are used by the inventor.

2. In the formation of a new kind of vitrified material for building purposes, produced by laying a coating of glass on slabs of porcelain or earthenware.

3. In a novel application of the compound vitrified substance, called parian, to architectural and building purposes.

And, lastly, in the manufacture of coffins, sarcophagi, and other like receptacles for the dead, from porcelain, parian, and earthenware, separately, or combined with other like plastic substances.

The claims embrace the four processes above described.

MATTHEW TOMLINSON, of Hulme, Manchester, druggists' sundries merchant. *Certain improvements in the manufacture of "species jars" or "show jars."* Patent dated January 1, 1853. (No. 9.)

The patentee remarks that it has been hitherto the invariable practice to manufacture such jars exclusively from flint glass, and that such flint glass jars are extremely liable to crack and become broken after the process of gilding and ornamenting is completed. The object of his improvements is to obviate these contingencies, which desirable result is obtained by manufacturing the cylinders or bodies of such species or show jars from sheet window-glass by the ordinary method of proceeding commonly employed in manufacturing glass shades, and then completing the jars by the addition of a shoulder and neck, so as to cause them to assume the desired form or appearance.

Claim.—The manufacturing such species jars or show jars from what is commonly termed "sheet window-glass," as above described, instead of manufacturing such jars from flint glass, as hitherto ordinarily practised.

DAVID HULETT, of High Holborn. *For improvements in the manufacture of ornaments for lamps, chandeliers, and architectural purposes.* Patent dated January 3, 1853. (No. 10.)

The object of this invention is to cheapen the cost of the above-named ornaments by stamping them in one or more pieces, and in any required design, out of sheet iron. Any of the ordinary stamping processes may be employed for this purpose, and, if desired, an embossed or raised surface may be given to such ornaments by the use of dies. The sheet-iron may be either turned or galvanized, and when it is necessary to heighten the effect, brass or copper may be used in connection with the iron. After the stamping process, the ornaments may be bronzed or coated, as is convenient. The same method is applicable to the manufacture of gas-fittings of various kinds, brackets, lamps, tops and ends of chandeliers, &c. The inventor purposes to employ tin-plate instead of sheet iron in some cases. Roses, and rosettes for the ceilings of rooms and halls; mouldings for rooms, doors, &c.; entablatures and frames for doors, mirrors, pictures, &c., are also to be formed of the same materials.

Claim.—The manufacture of such ornaments as are specified above from sheet or plate iron, or from tin.

JOHN BLEACKLEY, jun., of Myrtle-grove, Prestwich, Lancaster, bleacher. *For improvements in machinery to be used in washing, bleaching, dyeing, and sizing yarns and fabrics.* Patent dated January 3, 1853. (No. 11.)

This invention consists in placing a series of winces, having each four or other suitable number of arms and cross-rails, in a cistern containing water, or other fluid, and in causing the yarn or fabric under operation to pass under and over the rails of the said winces, the axes of which are placed so near to each other that the rails of each wince in revolving, pass between those of the adjoining one. Squeeze-rollers are fitted above the cistern, the lower one being formed of wood and coated with gutta-percha, and the upper one formed larger in the middle of its length than at its extremities, for the purpose of more readily pressing the fluid from the material when it passes up from the cistern.

Claim. — The application and use of winces, as described, for washing, bleaching, dyeing, and sizing yarns and fabrics.

EDME AUGUSTIN CHAMEROY, of Paris, France. *Improvements in motive power engines, and in the application of motive power to the same.* Patent dated January 3, 1853. (No. 12.)

This invention relates to a new system of obtaining motive power by the direct action of vapour upon a free or detached piston, which moves from end to end of a hollow cylinder, which cylinder moves about trunions attached to it at the middle of its length. Water, ether, chloroform, or any other easily vaporized liquid, may be employed. Each end of the vibrating cylinder terminates in a wide flattened chamber, bolted by suitable flanges to the cylinder ends. These chambers are vapour-generators, and are made of corrugated metal to increase the heating surfaces. Between them is placed a segmental piece, which, with the chambers, forms a semicircle, of which the cylinder is the diameter. Beneath the centre of the cylinder a stationary heating-chamber is placed, which is filled with a fluid heated by a flue passing beneath it, leading from the furnace. When the fluid employed for vaporization is poured into one of the chambers, and that chamber is brought down into the heating-chamber, the fluid becomes vaporized, and a pressure is brought upon the piston, which had necessarily fallen to the lower end of the cylinder. This pressure forces the piston up to the elevated end of the cylinder, which then, by the gravity of the piston, is carried down; upon which the chamber which was before in the heated reservoir rises, and passes against a refrigerator, which condenses the vapour within it; while the other chamber, containing a portion of the same fluid as the former, descends, and is heated in the same manner, and the cylinder is brought back to its original position. The process is repeated; and thus a vibratory motion is produced in the cylinder, and this is communicated to the driving-shaft by means of connecting-rods and cranks which work a central pinion.

The inventor also describes a different application of the same principle in an engine constructed with three cylinders, which revolves continually instead of vibrating as the former.

Two other machines, of somewhat analogous character, are described.

Claims.—The general arrangement of machinery, apparatus, or means for obtaining motive power, as described.

2. The systems or modes of producing the alternate expansion and condensation of the actuating medium, as described.

3. The system or mode of obtaining motive power by employing steam or other vapour to elevate a weight or piston, the whole being contained in a single closed vessel, or in several vessels in communication with each other.

4. The application and use of a motive-power machine, wherein the actuating force acts within a hollow cylinder, having no communication with the external atmosphere.

5. The application and use in such cylinders of a heavy piston or other weight, quite disconnected from the other details, the periodical displacement of such weight being the means of securing the motive power.

6. The application and use of vapour-generators and condensers, as described.

7. The application and use of a heated bath for plunging the generator into, to produce the necessary vaporizing effect.

8. The system or mode of constructing refrigerators, as described.

Lazare François Vaudelin, of Upper Charlotte-street, Fitzroy-square, Middlesex. *Improvements in apparatus for retarding and stopping railway carriages.* Patent dated January 3, 1853. (No. 13.)

This apparatus consists in a chain, strap, or cord, attached to each carriage, with a means of connecting them one to the other, when making up a train of carriages. The last carriage of a train has a barrel which, being turned, winds up the chains, cords, or straps which are in connection with apparatus to each carriage; such apparatus consisting of an axis with an arm, the axis having a toothed-wheel at one end, or both ends, taking into racks, in connection with breaks, by which the breaks are pressed against the wheels on one side, or on both sides, as the case may be. This will simultaneously be the case with all the carriages of the train.

Claim.—The means described of retarding and stopping railway carriages.

Charles Edward Amos, of the Grove, Southwark, Surrey, engineer. *Certain improvements in the construction of centrifugal pumps.* Patent dated January 3, 1853. (No. 14.)

The inventor describes and claims—

1. The casting of the cases in one piece, and furnishing the same with man-holes, arranged in the manner and for the purpose set forth.

2. The mounting of the axle of the fan or wheel in the manner described, for the purpose of reaching the different levels of the fluid without any readjustment of the pump being required.

3. The application to centrifugal pumps of a suction-pipe capable of rocking in its bearings, as explained.

Edward Clarence Shepard, of Duke-street, Westminster. *Improvements in the manufacture of gas.* (A communication.) Patent dated Jan. 4, 1853. (No. 16.)

This invention is a mode or modes of producing certain gases by the action of currents of electricity upon water which has

chemical matters dissolved in, or mixed with it; the gas, or gases, thus produced being combined with a hydro-carbon, either with or without a portion of atmospheric air, for the purpose of enabling the mixed or combined gases, when burnt, to produce a larger quantity of light and heat. The inventor suggests the use of several combinations or mixtures of chemical matters for the purposes of facilitating the production of the gases, and of rendering them more capable of combining with carbonaceous or hydro-carbonaceous matters, which combinations are obtained by bringing together mineral and vegetable acids.

For producing a gaseous hydro-carbon the inventor uses metallic sponges, formed of fragments of pit-coal, soaked in a solution of nickel or cobalt, and heated in covered crucibles, mixing these with essence of resin, and then heating the mixture.

Claims.—1. The mixture of vegetable with mineral acids and water for the purpose of producing gas.

2. The use of metallic sponges in the process of converting the essence of resin into a hydro-carbon gas.

3. The combination of gases produced by the action of currents of electricity upon water, and the gaseous hydro-carbon obtained as before described, with or without atmospheric air, for the purposes of heating and lighting.

Joseph James Welch, and John Stewart Margetson. *Certain improvements in the manufacture of travelling cases, wrappers and certain articles of dress hitherto manufactured of leather.* Patent dated January 4, 1853. (No. 17).

The claim of this invention is for making such articles as have hitherto been formed out of leather, from woven fibrous materials, and afterwards coating them with any elastic varnish or composition, which will not readily crack, so as to give them the appearance of leather, while their cost is reduced.

George Gwynne, of Hyde-park Square, Middlesex, Esq., and George Fergusson Wilson, of Belmont, Vauxhall, Surrey, managing director of Price's Patent Candle Company. *Improvements in treating fatty and oily matters.* Patent dated January 4, 1853. (No. 19.)

Finding that fatty and oily matters which have been treated with powerful acids do not burn well or distil freely, owing, as the inventors think to a combination, or intimate mixture of acid with these matters, they propose in this invention to effect a decomposition or separation of the above-mentioned combination by boiling the mixture in water, or in water mixed with acid, or by steam or watery vapour combined or free.

PROVISIONAL PROTECTIONS.

Dated May 7, 1853.

1131. Conrad William Finzel, of Bristol, Somerset, sugar-refiner. An improvement in refining sugar.

Dated May 10, 1853.

1141. Frederick Lipscombe, of the Strand, Middlesex, water-filter manufacturer. Improvements in obtaining motive power.

1151. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in machinery or apparatus for effecting agricultural operations. A communication.

Dated May 26, 1853.

1301. John Nurse, of Crawford-street, Bryanstone-square, Middlesex, coach-builder. Improved mechanism for fastening and unfastening doors, applicable especially to the doors of carriages.

Dated May 27, 1853.

1309. William Wolfe Bonney, of West Brompton, Middlesex, gentleman. Improvements in machinery for raising a pile or flue by abrasion on linen, cotton, silk, and other fabrics.

Dated May 28, 1853.

1313. Ebenezer Nash, of Duke-street, Lambeth, tallow-chandler, and Joseph Nash, of Thames-parade, Pimlico, chemist. Improvements in the manufacture of wicks.

Dated June 1, 1853.

1343. John Williams Thomson, of Forest-hill, Sydenham, Kent. Improvements in heating hot-houses, hotbeds, pits, conservatories, houses, churches, and other buildings.

Dated June 3, 1853.

1364. James Mayelston, of Elloughton, York, gentleman. Certain improvements in the manufacture and refining of sugar.

Dated June 15, 1853.

1445. Arthur Parsey, of Crescent-place, Burton-crescent, St. Pancras, Middlesex. A revolving engine to be worked by steam, air, gases, or water.

1449. Charles Wye Williams, of Liverpool, Lancaster, gentleman. Improvements in the manufacture of sheet iron, and of iron plates used for boilers, vessels, buildings, and other like purposes.

1451. Jules Dehau, of Rue Pigale, Paris. Improvements in the manufacture of yarn, and fabricating articles therefrom.

1453. James Dilkes and Edward Turner, of Leicester. Improvements in door-springs.

1455. William Gossage, of Widnes, Lancaster, manufacturing chemist. Improvements in obtaining certain saline compounds from solutions containing such compounds.

1457. Timoléon Zoé Louis Maurel, of Paris, France. Certain improvements in horological alarms.

Dated June 16, 1853.

1459. Edward Walmsley, of Heaton Norris, Lancaster, spinner, and John Holmes, of Manchester, Lancaster, engineer. Improvements in and applicable to steam engines.

1461. William Christopher, of Euston-square, and Gustavus Gidley, of Robert-street, Hoxton. Improvements in abstracting sulphur and other matters from vulcanized India-rubber.

1463. James William Gibson, of Long-acre, St. Martin's-in-the-fields, London. A new method of pavement, tending to secure the evenness of the road and proper adhesion to the foot.

1465. Joseph Ilsley, of Lisbon, Portugal, professor of physics. Improved telegraphic apparatus.

1467. Peter Armand Lecomte de Fontainemoreau, of Rue de l'Echiquier, Paris, and South-street, Finsbury, London. An improved process for preserving milk, and its application to several organic products and alimentary substances. A communication.

1469. Clinton Roosevelt, of New York, United States of America. Reducing the friction of the journals of railway and other carriages, which is also applicable to the journals of machinery.

1741. Benjamin Finch, of Seville Works, Dublin, engineer. Improvements in apparatus for supplying water to steam-boilers.

1473. Solomon Solomon, of Aldgate, and Samuel Mills, of St. George's-in-the-East, Middlesex. Improvements in axle-boxes for locomotive engines, railway and other carriages, applicable to the bearings of machinery.

Dated June 17, 1853.

1474. Edward Rodgers, of Livsey-street, Manchester, machine-joiner. An improvement in looms for weaving.

1475. Christopher Waud and Edward Waud, of Bradford, York, worsted spinners, and William Busfield, overlooker to the said Messrs. Waud. Improvements in preparing wool and other fibrous substances.

1476. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, London. Improvements in machinery for pulverizing and washing quartz or ore, and for amalgamating the gold contained therein. A communication.

1477. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, London. An improved stove or kiln.

1478. Robert Lister, of Scotswood, Northumberland, brick-maker. Improvements in chimney-tops or flues.

1479. Henry Bleasdale and Joseph Bleasdale, of Chipping, Lancaster. Improvements in working, tilling, or preparing land.

1481. John Piddington, of Brussels, Belgium, gentleman. Improvements in obtaining infusions and decoctions, and in vessels or apparatus employed therein. A communication.

Dated June 18, 1853.

1482. William Hall, of Aberdeen. Improvements in ship-building.

1483. Henry Bessemer, of Baxter-house, Old St. Pancras-road, Middlesex. Improvements in the manufacture of waterproof or partially waterproof fabrics.

1484. Henry Saunders, of Yeovaney Staines. Improvements in drying grass and other crops.

1486. Edgar Breffit, of Castleford, York, glass-manufacturer. Improvements in the manufacture of glass-house-pots.

1488. Thomas Adamson and William Adamson, of Sunderland, Durham. Improvements in pumps.

1489. James Heginbottom and Joseph Heginbottom, of Ovenden, Halifax, York, cotton-spinners. Improvements in spinning.

1490. James Shanks, of St. Helen's, Lancaster, manufacturing chemist. Improvements in the manufacture of alkali from common salt.

1492. William Armand Gilbee, of South-street, Finsbury, London. A new mode of ornamenting stuffs and paper. A communication.

1493. James Worrall, junior, of Salford, Lancaster, dyer and finisher. Certain improvements in machinery or apparatus for washing, bleaching, and dyeing fustians, beaverteens, cantoons, satteens, twills, and other textile fabrics.

1494. John Cross Richardson, of Lilly-hill, near Manchester, Lancaster, manufacturer. Certain improvements in machinery or apparatus for winding yarn.

1495. John Cross Richardson, of Lilly-hill, near Manchester, Lancaster, manufacturer. For the invention of certain improvements in looms for weaving.

1496. George Robinson, of the firm of Binyons, Robinson, and Co., of Manchester, Lancaster, tea and coffee merchant. Certain improvements in apparatus for roasting and desiccating coffee, cocoa, and chicory.

1497. Samuel Schofield, of Oldham, Lancaster, cotton-spinner. Certain improvements in machinery or apparatus for preparing and spinning cotton and other fibrous materials.

1498. George Young, of Neath, South Wales, merchant. Improvements in grinding wheat and other grain.

Dated June 20, 1853.

1499. Charles Crickmay, of Handsworth, Stafford, gun-manufacturer. Improvements in the construction of fire-arms.

1500. John Paul, paper-stainer, of Manchester, Lancaster. Colouring paper on the surface.

1501. Robert Midgley, of Northowram, Halifax, York, worsted-spinner. Improvements in preparing and finishing certain worsted yarns, and in apparatus employed therein.

1502. Hiram Barker, of Manchester, Lancaster, engineer and tool-maker, and Francis Holt, of Manchester, engineer. Improvements in machinery and apparatus for grinding and turning metals.

1503. William Boggett, of St. Martin's-lane, Middlesex, gentleman, and George Brookes Pettit, of Lisle-street, gas-engineer. Improvements in dioptric refractors.

1504. William Hodgson and Henry Hodgson, of Bradford, York, machine-makers. Improvements in machinery for spinning wool, hair, silk, flax, and other fibrous substances.

1505. John William Perkins, of Narrow-street, Limehouse, Middlesex, analytical chemist. Improvements in the manufacture of artificial manure.

1506. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery for drilling or boring rocks or other hard substances. A communication.

1507. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. An improved manufacture of handles for knives and other similar articles. A communication.

1508. Charles Louis Defever, of Steenbrugge les Bruges, Belgium, merchant. An improved preparation for lubricating machinery.

1509. Richard Cornelius, of Old Town-street, Plymouth. Improvements in the construction of churns for producing butter.

1511. Allan Macpherson, of Brussels, Belgium, merchant. Improvements in disinfecting sewers or other drains, and in converting the contents thereof to useful purposes.

1513. Pacifique Grimaud, of Paris, gentleman. A new ærogaseous drink, which he calls "Grimaudine."

1514. Henry Blatin, of Rue Bonaparte, Paris, France, gentleman. Improvements in buckles.

Dated June 21, 1853.

1515. Charles Cowper, of Southampton-buildings, Chancery-lane, Middlesex. Improvements in the manufacture of cards, or substitutes for cards for the Jacquard loom. A communication.

1516. Joseph Newton, of Ickwell, Bedford, horticulturist. Improved apparatus for heating buildings, applicable also to horticultural purposes, and to hatching and rearing poultry and game.

1517. Thomas Wilson, of Manchester, Lancaster, corn-factor and miller. Improvements in screens, or machinery for cleaning wheat and other grain.

1518. John Drummond, of Edinburgh, Scotland, mechanic. A reaping-machine.

Dated June 22, 1853.

1521. John Henry Noone, of Salisbury-street, Portman-market, Middlesex, journeyman coach-builder. An improved method of stopping railway trains, and preventing railway accidents.

1522. Frederick Ayckbourn, of Guildford-street, Russell-square, Middlesex, patent folding-boat manufacturer. Improvements in the manufacture of waterproof fabrics.

1523. Francis Huckvale, of Choice-hill, near Chipping Norton, Oxford. Improvements in hand-hoes.

1524. William Geeves, of the Caledonian Mills, New Wharf-road, Caledonian-road, Middlesex. Improvements in the manufacture of bricks.

1525. Charles Topham, of Hoxton, Middlesex, engineer. Improvements in apparatus for measuring liquids, gases, and other elastic fluids, and for regulating the flow thereof, which apparatus may also be applied to the obtaining of motive power.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," July 1st, 1853.*)

248. Richard Palmer. An invention which may be used for cutting turnips, mangold-wurtzel, carrots, and other roots, or for bruising them only, or reducing them to a pulp, and for mixing them with meal as may be required, and also for grinding or crushing apples for cider.

265. John Pinkerton. A new mode of applying and combining ornamental glass in the manufacture of useful and ornamental articles.

(*From the "London Gazette," July 5th, 1853.*)

259. William Pizzie. A railway carriage break.

290. Thomas Spiller and Anthony Crowhurst. The propelling steam vessels.

291. Manoah Bower. A new or improved apparatus to prevent the throwing up of mud by the wheels of vehicles.

292. John Heckethorn. An improved colouring matter for coating or covering the exterior or interior of buildings, some of the ingredients of which such colouring matter is composed being capable of conversion into size, paste, and ground colour for priming or giving the first coat or covering to work intended to be coloured with oil paint.

297. John Henry Johnson. Improvements in gas-burners, and in regulating the combustion of gas. A communication.

306. George Winiwarter. Certain improvements in the application of explosive compounds.

340. Thomas Reynolds, Henry Reynolds, and Stephen Reynolds. Improvements in the means of retarding the progress of carriages.

390. Benjamin Greening. Improvements in machinery for making fences and other similar articles of wire.

410. Alfred Vincent Newton. Improvements in the manufacture of printing-surfaces. A communication.

445. Thomas Bell and Richard Chrimes. Certain improvements in valves applicable to the receiving and discharging of water or other fluids.

470. Emile Adolphe Hermann. Certain improvements in machinery for manufacturing woollen cloth. A communication.

497. Theodore Baron Von Gilgenheimb. A new machine, with its adjuncts or other apparatus to be used for agricultural purposes.

514. John McAdams. Improvements in machinery or apparatus for printing on leaves of books their designations, numbers, or devices, or those of their pages, which machinery or apparatus may also be used to advantage for printing designating-numbers or devices on various other articles.

532. Robert Barclay. Improvements in rotary engines for obtaining motive power, and for transmitting aëriform bodies and fluids.

723. Robert Walker. Improvements in working and increasing the safety of railways.

915. Jean Baptiste Maniquet. Certain improvements in machinery or apparatus for winding, cleaning, doubling, twisting, and spinning silk, cotton, wool, flax, hemp, and other filamentous materials.

981. Henry Houldsworth. Improvements in machinery used for combing cotton, silk, silk waste, flax, tow, wool, and other fibrous substances.

1054. John Balmforth, William Balmforth, and Thomas Balmforth. Improvements in steam hammers.

1089. Thomas Masters. Improvements in apparatus for freezing, cooling, and churning.

1131. Conrad William Finzel. An improvement in refining sugar.

1141. Frederick Lipscombe. Improvements in obtaining motive power.

1223. Bernard Peard Walker and James Warren. Improvements in the manufacture of iron.

1261. George Marriott. Improvements in the manufacture of fire-lighters.

1313. Ebenezer Nash and Joseph Nash. Improvements in the manufacture of wicks.

1321. Edward Duclos de Boussois. Improvements in preventing incrustation of steam boilers.

1367. Thomas Barnabas Daft. Improvements in inkstands.

1390. Frederick Lott. Improvements in cartridges.

1395. Henry George Rowe, Albert George Andrew, and William Henry Andrew. Improvements in the mode of fastening the handles of table-knives and forks.

1416. James Robert Napier and William John Macquorn Rankine. Improvements in engines for developing mechanical power by the action of heat on air and other elastic fluids.

1424. Christopher Nickels and James Hobson. Improvements in the manufacture of carpets and other piled fabrics.

1438. Robert William Sievier and James Crosby. Improvements in looms for weaving.

1440. John Henry Johnson. Improvements in railway brakes. A communication.

1441. Thomas Richardson. Improvements in the manufacture of certain salts of magnesia, and a red colouring matter.

1442. Joseph Leon Talabot and John Davie Morries Stirling. Improvements in the manufacture of iron.

1443. Alfred Vincent Newton. An improved mode of manufacturing cast steel. A communication.

1450. John Macintosh. Improvements in the construction of portable boats or vessels and buoys.

1453. James Dikes and Edward Turner. Improvements in door-springs.

1455. William Gossage. Improvements in obtaining certain saline compounds from solutions containing such compounds.

1465. Joseph Ilsley. Improved telegraphic apparatus.

1469. Clinton Roosevelt. Reducing the friction of the journals of railway and other carriages, which is also applicable to the journals of machinery.

1471. Benjamin Finch. Improvements in apparatus for supplying water to steam boilers.

1475. Christopher Waud and Edward Waud and William Busfield. Improvements in preparing wool and other fibrous substances.

1483. Henry Bessemer. Improvements in the manufacture of waterproof, or partially waterproof fabrics.

1493. James Worrall, junior. Certain improvements in machinery or apparatus for washing, bleaching, and dyeing fustians, beaverteens, cantoons, satteens, and other textile fabrics.

1496. George Robinson. Certain improvements in apparatus for roasting or desiccating coffee, cocoa, and chicory.

1497. Samuel Schofield. Certain improvements in machinery or apparatus for preparing and spinning cotton and other fibroûs materials.

1503. William Boggett and George Brooks Pettit. Improvements in dioptric refractors.

1504. William Hodgson and Henry Hodgson. Improvements in machinery for spinning wool, hair, silk, flax, and other fibrous substances.

1507. William Edward Newton. An improved manufacture of handles for knives and other similar articles. A communication.

PATENT APPLIED FOR WITH COMPLETE SPECIFICATION.

1548. Antoine Andraud, of Paris, France. Certain improvements in railways and locomotives running thereon, which improvements facilitate the ascension of steep inclines. June 25.

WEEKLY LIST OF PATENTS.

Sealed July 1, 1853.

1852:

955. William Keates.

1853:

9. Matthew Tomlinson.
19. George Gwynne and George Fergusson Wilson.
21. Jean Baptiste Pascal.
28. Herbert Newton Penrice.
215. Joseph Scott.
253. John Mason.
541. John Wright.
581. Jacques Francisque Pinel.
820. John Thomas.
969. James Davis.
970. William Sager.
974. Cyprien Marie Tessie du Motay.

Sealed July 4, 1853.

1853:

17. Joseph James Welch and John Stewart Margetson.

Sealed July 5, 1853.

1853:

20. William Edward Newton.
24. Thomas Shilton.
25. Charles Frederick Whitworth.
30. Emile Grillet.
36. Robert Whinery.
45. Thomas Pape.
70. William Weild.
80. James Fletcher.
251. Louis Guillaume Perreaux.
472. Thomas Brown Jordan.
602. Edward Maitland Stapley.
880. François Felix Verdié.
943. Frederick Henry Smith.
1032. Peter Fairbairn and Ferdinand Kaselowsky.
1075. Richard Quin.
1096. Thomas Taylor.
1097. William Edward Newton.
1130. William Boggett and George Brooks Pettit.
1147. Robert Brown.
1157. Samuel Cunliffe Lister.
1175. Joseph Denton.
1181. George Bertram.
1184. Charles Tetley.
1196. Herman Dirs Mertens.
1207. Jean Emile Barse.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

CONTENTS OF THIS NUMBER.

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Mechanics' Magazine.

No. 1562.] SATURDAY, JULY 16, 1853. [Price 3d. Stamped 4d.

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ADAMS' PATENT AXLE-LUBRICATORS.

Fig. 1.

Fig. 3.

Fig. 6.

Fig. 8.

Fig. 2.

Fig. 4.

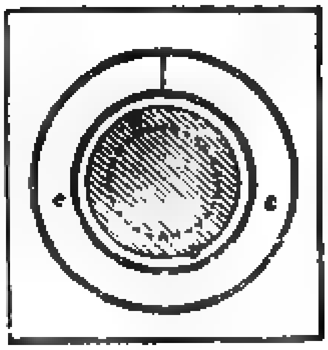
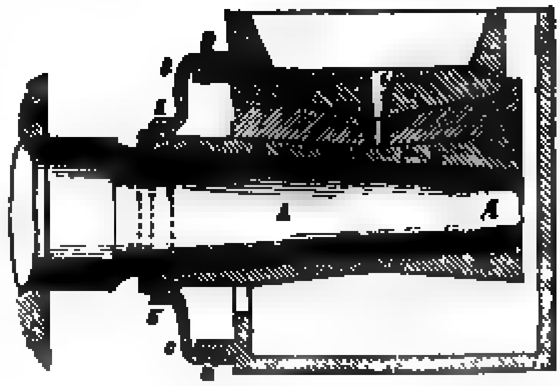


Fig. 5.



ADAMS' RAILWAY-AXLE LUBRICATORS.

The following paper on railway-axle lubrication was read by Mr. W. Bridges Adams, at the last meeting of the Institution of Mechanical Engineers:

In calculating the surface-bearing of axles, there are two circumstances to consider:—First, the actual weight to be borne; and, secondly, the amount of concussion adding to the effect of the weight, which latter will much depend on the efficiency of the springs to moderate the effect of the shock. Before the advent of railways, mail-coaches and private carriages, with a maximum weight of three tons, were constructed with axles case-hardened, and with a bearing-surface on each arm equivalent to thirty-six inches. This is equivalent to about 56 lbs. per square inch on the bearing.

Mr. Nicholas Wood, in his experiments on axle-friction, found that, with the best oil, and with favourable circumstances, a superincumbent weight of 90 lbs. per square inch gave the minimum of friction. Some of the earliest railway axle-bearings were 4 inches in length by 2¼ in diameter, something under 14 inches of total bearing-surface, fitted according to Mr. Wood's calculations, only for a wagon of two tons total weight. It would seem as though these sizes had been calculated from the fixed shafting of factories, without any calculation of concussion. Probably this was the reason why viscid soap was substituted for fluid oil, increasing the toughness of the material used for lubrication to make up for the want of bearing-surface. In railway practice it is found that the soap or grease which serves well in the winter is too fluid in the summer, a sure proof that the bearing-surface is far too small for any lubrication with oil, which offers the minimum amount of friction. A strong objection to soap-lubrication is, that it requires considerable amount of friction in the winter time to make it fluid; and it is sometimes difficult to start a train into motion when the grease has been frozen.

In the wheels of highway carriages, the oil-chambers are contained within the wheels, and revolve with them, which process involves the efficient lubrication of the axle. In the axle-boxes of railway carriages the grease or oil does not revolve. In the highway wheels, the oil always has a tendency to rest in the well or magazine below the level of the axle. In the ordinary axle-boxes of railway carriages, the grease or oil is above the level of the axle, and, as the axle revolves, the oil or grease, or rather the grease (oil not being used, except in engines), passes through a hole or holes in the bearing brass, which lies on the upper half of the axle; and thus the process is like that of a handmill, the lubricating material is supplied on the upper surface of the axle, and passes away at the lower like grist. To make the lubrication more certain, the holes are of a large size; and this involves an evil by diminishing the bearing surface at the most important point. If these holes get stopped, the lubrication ceases and heating ensues; and there are no means to remedy the evil, save by lifting the bearing from the axle and inserting more grease. Thus, in the ordinary railway grease-box, there is not only a great waste of grease, but also a very imperfect mode of securing lubrication. The well-made, case-hardened axles of common road carriages are capable of running 5,000 miles over a bad road with once oiling with a small quantity of oil, while railway axles require greasing every 100 miles or less, with some few exceptions.

Impressed with these imperfections, the writer some years back began to consider the best means of remedying them. It was evident that the only mode of applying grease or oil to a large surface of the axle-bearing was at the under side. In the common mode of an open bottom this was scarcely practicable; and the question was, could the bottom be effectually closed without so confining the axle as to make partial heating dangerous. This was accomplished by applying a flexible connection between the axle and the inner side of the axle-box, and making the bottom of the box tight. In this mode, the grease filling the lower part of the box, the whole under surface of the axle was bathed in it, while all dirt and grit were excluded. Moreover, the grease being as it were in a well below the axle, any accidental extraneous matters would sink to the bottom, and not be brought in contact with the wearing surface. And supposing the upper holes to be entirely stopped, lubrication would go on notwithstanding. It must be evident that feeding from above in all cases involves the chance of dirt getting to the axle, which feeding from below obviates.

To provide against accidental injury to the axle-bearing, the writer provided also for a mode of shrinking on a false bearing upon the axle arm; so that, in case of cutting, it might be removed and replaced. The following is a description of the axle-box invented and patented by Mr. Adams, in May, 1847, which is shown in the accompanying engraving:—Fig. 1 is a longitudinal section, and fig. 2 a transverse section, of the axle-boxes employed on the North Kent line. The top of the box is circular, for a peculiar arrangement of springs; the box is cast open-fronted with a movable front, A, to attach by

screws, a grease-tight joint being maintained by an elastic substance between. In this mode the interior of the box can be inspected, and a new brass applied, without lifting the carriage. The back of the box round the axle is cast with a round-edged projecting lip, BB. A plate of metal, CC, with a centre hole fitting the axle, is secured by bolts to the back of the box, with a piece of leather, D D, the orifice of which is enlarged into a partial pipe-form round the axle, to give increased bearing surface. This leather presses equally on the axle and on the lip of the box, and thus a tight joint is maintained, which preserves the grease without overflowing above the level of the bottom of the axle. The bolt-holes in the metal plate are oblong vertically, so that when the upper bearing brass wears and causes a corresponding wear in the plate and leather, and a consequent leak below, the two latter may be drawn upward to fit the lower part of the axle. At the top of the box there is a screw-tap, E, for feeding, with holes through it, to admit the ingress and egress of air. This tap serves to feed an upper chamber, F, with holes to the axle as usual, and also to feed the lower chamber, G, which, in addition, catches the grease that falls though from the upper chamber by the working of the axle. A piece of hard wood, H, is applied between the end of the axle and the front of the box, to prevent wear of the shoulder-collar of the bearing brass. Two rollers of light wood, I I, float on the oil or grease in contact with the lower side of the axle, and thus carry up the lubricating meterial, if it happens to be below the level of the axle.

Figs. 3 and 4 are a longitudinal section and back view of an axle and axle-box, also for an upper and lower feed. To retain the grease or oil, a conical metal spring, CC, is inserted in a corresponding circular groove at the back of the box; by its elastic expansion it presses against a strip of leather lining the groove, and thus forms a tight joint. The small end of the conical spring clips a leather pipe-collar, D D, fitted on the axle which collar may either revolve with the axle in the small end of the spring, or it may be fixed to the spring, and the axle revolve within the leather collar; as the spring expands against the groove in the box, it has no tendency to press the axle or leather too tightly, so as to cause friction. The conical spring is prevented from turning by a stud; the edges of the spring overlap each other, to keep out dirt; and the hollow space between the spring and the axle may be filled with sponge or cotton waste.

Figs. 5 and 6 show a longitudinal section and back view of an axle-box on a similar arrangement, in which a conical pipe of blocked leather, C C, is secured to the box-lip by an elastic ring, D D, similar to a key-ring, and clipped to the axle by a second ring, E E. Both the spring cone and the leather cone will, by their free action, accommodate any irregular movement of the box, and prevent loose wear between both the metal plate and leather. In all cases where any material comes in contact with the revolving axle, it is essential that the surface be properly smoothed, that the pressure be as light as may be convenient, and the lubrication certain.

Fig. 5, in addition to the axle-box arrangement, shows a mode of applying movable journals to axle-arms, either new or old. Thus the journal, A A, may be forged down to a taper, with the object of extending the distance of the bearing from the wheel, or of increasing the diameter of the axle-bearing. The movable bearing, B B, may be of wrought-iron, or cast-iron well got up and case-hardened; and manufacturers might be enabled to supply a superior class of axle-box and bearing cheaply. Railway companies might thus be enabled, at a comparatively little cost, to replace their axles, when rendered unsafe by long vibration in running. The hollow axle, shown at figs. 7 and 8, would be well adapted to this arrangement.

Great numbers of these boxes, with leather collars, have been applied, and have been found to answer the desired purpose. It should be remarked, that it is desirable, in all cases, to get the axle-bearings as long as is convenient, even when not required for bearing surface, for the following reasons:—The points of the springs which support the frames are at a considerable elevation above the axle-bearing, and act with mischievous leverage to tilt the axle-boxes laterally to the carriage, when the wheel flanges strike the rail. It is evident that, unless there be some proportion in the length of bearing to the height of the spring, there will be a great strain upon the guards of the axle-boxes to keep them steady.

The axle-box described above is the first application of the principle of retaining the grease or oil, by closing in the back of the box. Since the above described, similar contrivances have been brought out by various other parties, for the purpose of retaining the grease in the axle-boxes; but it appears that the original application of the principle was that of Mr. Adams, in May, 1847; and there does not appear to be any material variation in any of the subsequent plans.

As to the practical mechanism for keeping out dirt and preserving the bath of grease, it must vary with circumstances. Many axle-boxes are so close to the wheel-bosses, that

the leather pipe collar is the only practicable arrangement; and, having come into general use, it is difficult to vary, but the writer prefers the elastic metal collars, C C, shown in figs. 3 and 7, pressing upon leather pipe collars, D'D. The object sought is to form a tight joint between the box and the axle, which are both exposed to rough jolts and a tilting movement of the box on the axle; therefore, the medium to form the joint should be flexible, and not liable to be put out of order. The mode of lubrication from above the bearing has one objection, in the liability to accident by dirt getting on the arm, and from the holes wasting a most important part of the bearing surface; but the writer thinks it preferable to retain it, keeping the holes small, but merely as a security in case of any accident happening to the lower reservoir.

Two forms of journal are shown in the figures; one the double cone, figs. 5 and 7, the other the ordinary cylindrical journal with collars, figs. 1 and 3. There is an advantage in the double cone with the small diameter in the centre of the bearing, that it has a tendency to cause the lubricating fluid to press outwards from the centre while in rapid motion. The cylindrical bearing between collars has also this disadvantage, that the box is not kept in its position by gravity, but by a very small collar surface, which, being vertical, does not retain the lubricating fluid so easily as the horizontal surface; and, moreover, by its larger diameter, has a tendency to throw it off by centrifugal action. Where the boxes fit tightly to the guards, the collar-bearings are frequently subject to rapid wear, and lateral thrust is more destructive than the downward pressure of the load. The small rounded corners next the collars, intended to prevent the "nicking" or breaking of the axle, are of little service to give the box a centripetal tendency. The cylindrical bearing has the advantage, that the bearing-surface is not lessened by end play, and with the axle working in a bath of lubricating material, the collars will at all times be safe enough. In either case, of the cone or the cylinder, it is clear that the lubricating bath below will be the safest precaution against heating. As regards the strength of the axle, the cone journal has the advantage, by its gradual tapering form, supposing an equal amount of metal in both cases. The fitting of the wearing brass to the journal is a matter of greater nicety with the cone than with the cylinder; with cylindrical journals the usual practice is to make the bearing brass of considerably larger radius than the journal, so that it bears on a very small surface, which wears to a polish, and gradually extends to the half diameter. In point of fact, railway bearings are made to grind themselves to a true fit to work, instead of being accurately ground and fitted beforehand, as in the case with nicer machinery.

The Chairman, at the close of a short discussion, said he hoped Mr. Adams would pursue the subject, and give them further results; and he proposed a vote of thanks to him for his paper, which was passed.

THE LANCASHIRE SEWING-MACHINE.

A MACHINE bearing the above title, which has attracted a great deal of attention and is coming into very general use in London and other large provincial towns, has been exhibited to us in operation at the offices of the Company formed for the purpose of carrying out the patent, No. 2, Lawrence-lane, Cheapside. By this invention, which is extremely simple in its nature, a complete revolution may be expected to take place in the fabrication of clothing, especially in such as is made from stout cloth, and generally in all the arts where strong stitching or sewing has to be performed. From the description of the machine which we propose to give, it will be perceived that all the stitches will be of uniform length, but the tension of the thread in each place will be constant, and that the stitching will be much stronger than that produced by hand-work. Every portion of a garment may be swen by this machine with rapidity, strength, and extreme neatness, excepting only the stitching of the buttons and button-holes, and without regard to the work being light or heavy, coarse or fine. It admits also of a successful application to gaiters, boots, shoes, corsets, sacks, bags, sailcloths, &c.

The stitching in this machine is effected by two needles, each of which is supplied with thread from its own bobbin. One needle working vertically, and the other horizontally through the loops made by the first, a chain-stitch is produced which possesses great beauty as well as superior strength. The entire apparatus, which stands upon a square foot of surface, and is only about a foot in height, is actuated by a small heavy wheel, to which a handle is attached; and in very rapid work this handle is drawn by a treddle and link. Upon the shaft, at the end of which the driving-wheel is keyed, is a cam-groove, in which the short arm of a lever terminating in a globe is made to work. The upper end of this lever receives a reciprocating motion from the continued action of the machine, and

the length of stroke thus obtained is employed, together with a subsidiary arrangement, for giving motion to the vertical needle. A large arm rises from the apparatus, at the back, and stands forward, its front extremity terminating in the apparatus which carries the needle. Immediately underneath the top plate of the machine, and so placed as to act upon the same point as the extremity of the vertical needle, is the horizontal needle. This instrument is of a spiral form, the particular curve of which ensures the perfection of the work. It is mounted on a short vertical arbor which carries a toothed-pinion. A toothed arc gears into this, and the arc having a reciprocating motion imparted to it by a cam-groove apparatus upon the main-shaft, participates in that motion. The bobbin for the vertical needle is placed vertically in a convenient situation at the top of the machine, and by means of a tightening-screw the tension of the sewing-thread is adjusted, and with it the tightness or looseness of the sewing. From the bobbin the thread is conducted through an eye fixed on the apparatus, and then through the eye of the needle, which is not far from the point, and finally returned upwards before the operation begins. The bobbin for the horizontal needle is mounted on an horizontal axle in a corner of the apparatus underneath the top plate. Its thread is laid in a small groove formed in the outside of the spiral, and is finally brought through an eye near the point.

If this general description of the machine is understood, there will be no difficulty in comprehending its operation. The cloth, having the line of sewing creased, or otherwise marked out, is laid upon the top plate, with the beginning of the line immediately under the vertical needle. If the machine be actuated slowly, it will be seen that the vertical needle is driven downwards through the cloth, and that immediately after it is drawn back the continuous action of the machine drives the horizontal needle through the loop which it leaves. Thus the thread of the vertical needle embraces that of the horizontal one, at the same time that the latter also enters the cloth. By the aid of another cam, a short stroke is given to a small platform having a surface cut into minute pyramids, so as to enable it to grasp the cloth firmly when pressure is made upon it from above, by means of a plate with a spiral spring re-acting against a fixed obstacle. The result of this simple contrivance is, that at the completion of each stroke of the needles the motion of the platform carries the cloth from under the vertical needle, and that needle at each successive stroke, and the horizontal needle also, works in new cloth. As the length of stroke of the platform admits of adjustment at the pleasure of the operator, it follows that the stitching can be made as coarse, or as fine, as is desirable. The machine being thus rendered self-feeding, it is only necessary to guide the cloth in such a manner that the needles shall work upon the required line. It is equally indifferent to the success of the operation, therefore, whether the sewing be required to take place in a straight line, or upon a curve, to turn a sharp curve, or to make a series of zig-zags.

Speaking of this machine, upon its introduction from America into Glasgow by Mr. Darling, the *Glasgow Chronicle* says:—

"The patent sewing-machine promises to produce a revolution in the business of the seamstress as great as the power-loom effected in that of the weaver. This is, in truth, a moderate statement, for the capabilities of the machine have not yet been fully tested, and it is impossible to say how far its influence on the labour-market may yet extend. Sewing is effected by this machine with amazing rapidity, running off in something less than a minute a line of stout sewing which an ordinary seamstress would scarcely overtake in the course of half an hour! Line after line it traces with unabating celerity and ease, till the two bobbins which supply the thread to the double needle machinery be wound off. By the hand, the machine may be driven at the rate of 500 stitches per minute, by the foot, at nearly twice that rate. Nor must it be supposed that the work executed at this extraordinarily rapid rate is loose, irregular "slop" sort of work. On the contrary, it is strong close sewing, beautifully regular, and altogether such as it would require a very firm and well-practised hand to equal. Now, after all that has been said about American reaping-machines, what will be said about this new American sewing-machine, which seems likely to do still more towards facilitating indoor-labour than the larger invention towards abridging the work of the field? We do not wish to exaggerate the probabilities of the case, but it must be remembered that the invention has so far passed the period of probation that it is in very extensive operation in America, that such trial as it has had in this country has been extremely successful, and that already its inventors are improving on it and adapting it still more carefully and completely to its end. Looking at it when at work, it is impossible to resist the conclusion that it is destined completely to supersede all ordinary plain hand-sewing, and that such sewing, as an occupation for either men or women, tailors, or seamstresses, is gone for ever."

To this we may add the representation which is made of its powers by the gentle-

man who showed it to us, and which the rapidity of its action appears to justify;—viz., that it can produce as much work as twenty hard sewers, while its uniformity of work in strength and appearance gives to it a greater value. It is impossible not to believe that a displacement of this kind of skilled labour must be the result of this invention; but as a reduction in the price of garments must also be the result, it is extremely probable that that will take place here which has so frequently taken place in other branches of hand-industry where the machine has become predominant, that a largely increased demand will restore the amount of labour dispensed with, and thus in the meanwhile the public will have been benefited.

THE IRON TRADE.

THE iron trade continues brisk, and orders have been given out more cheerfully since the reduction of last week to £9 per ton. There is more firmness in the market, and less tendency to underselling than before the reduction. The rate of wages paid to the miners is a tolerable guarantee against any further underselling, and a reduction of wages at present is all but impossible. The men have gained an advantage they will not easily be induced to give up, and any attempt to force them would only be attended with a loss of time and money, which would be most injurious to the masters.

The present being the week immediately preceding the quarterly meetings of the ironmasters, when future nominal prices are to be determined upon, as a matter of course there has been comparatively a small amount of business transacted among the middle-class, or smaller purchasers of iron. Heavy sales have, however been made by the first firms, and the demand for rails, sheets, boiler-plates, &c., is so great, that not only is there a certainty of the present reduced prices being maintained, but some persons are sanguine enough to expect a return to the prices of last quarter. This would, however, evidently be a mistake, as there is every reason to believe that the buoyancy of the iron trade at the present moment is in some degree to be attributed to the reductions agreed upon at Stewpony on Thursday week. Since then, however, another meeting of the trade to reconsider that proposal, was held at Wolverhampton, but owing to the thinness of the meeting, the business was still further adjourned, the prevailing opinion of those present being, that it would be much better to allow the makers of pig-iron to exercise their own discretion as to the blowing out of their furnaces.

At the recent meeting held at Stewpony, it was proposed, and understood to be agreed to, that a number of furnaces should be blown out for the purpose of enabling the holders of large stocks of pig-iron to work them off. The number of furnaces now at work in South Staffordshire district is 123, and 33 out of blast; making in all 156—a number equal, when at full work, to produce an enormous quantity of iron.

The Government returns for the month, just published, show a considerable increase in our exports of iron and hardware, and there can be little doubt that if prudence is observed by masters and workmen, a prosperous future lies before them. The state of the pig trade is the only drawback to these flattering prospects. That branch of the iron trade remains dull, and is likely to continue so, in consequence of the present enormous make. Several of the most eminent firms, it is stated, are about blowing out some of their furnaces, in order to reduce their make.

Glasgow Pig-iron Market.—Glasgow, June 9.—The steady demand for pig-iron for shipment and consumption has, during this week, kept prices well up, even in face of the unfavourable aspect of continental affairs. To-day the market has been very firm, with a fair business done at 53s. 6d. to 54s.—the latter the closing quotation. No. I, 55s.; Gartsherrie, 58s.

America.—By the Royal Mail Steam-ship *Asia*, which arrived at Liverpool on Sunday with advices from New York to the 29th ult., the iron-market of that city appears to have been inactive.

RECENT PATENT CASES.

BEART'S PERFORATED BRICKS.

Before Vice-Chancellor Sir J. Stuart, July 7.
Beart v. Veasey, and same v. Armitage.

MR. BACON moved upon notice for an injunction in each of the above suits to restrain the defendants from making or vending any perforated bricks upon the principle of the inventions belonging to the plaintiff, or either of them, during the remainder of the respective terms of the plaintiff's patents, and from counterfeiting, imitating, or resembling the same inventions, or either of them. The plaintiff claimed under two patents—one granted in 1845, and the other in 1850. The first patent was for improvements in the manufacture of bricks and tiles. It was an invention which consisted of making bricks with perforations in them. The old system of brick-making, with which everybody was familiar, consisted of making the brick in a mould; and, after having been formed, it took a long time to dry, and then to bake,

owing to the quantity of moisture that was contained in it, and each brick was made singly; but this could only be done during three months in the year. By the plaintiff's invention bricks could be made at all times of the year, and in the course of about four days, so as to be then perfectly ready for use. The second patent—that of 1850—was for an improvement in the machinery for which the first patent had been granted. Mr. Veasey is a brickmaker and a banker, carrying on business in Huntingdonshire, and Mr. Armitage is a manufacturer of machines.

The defendants, Mr. Veasey and Mr. Armitage, had each of them been served with a notice of the present action, but they did not appear to oppose it.

The Vice-Chancellor made an order in each case for an injunction in the terms of the notice of motion.

ECCLES' SELF-ACTING MULE.

Court of Queen's Bench. Guildhall, July 6 and 7.—Sittings at Nisi Prius before Lord Campbell and a Special Jury.

ECCLES AND OTHERS *v.* MACGREGOR.

Sir F. THESIGER, Mr. Atherton, Q. C., and Mr. Bovill appeared for the plaintiffs; and the Attorney-General, Mr. Hugh Hill, Q. C., Mr. Hindmarch, and Mr. Webster for the defendant.

This action was brought to recover damages for an infringement of a patent which had been granted to the plaintiff for a self-acting mule, used in spinning cotton, the alleged improvements consisting of a radial bar and fixed drum, to regulate the motion of the spindle, so as to accommodate itself to the varying size of the "cop."

The defence was that the alleged invention was neither new or useful.

There was a great conflict in the evidence given by the scientific witnesses upon these points, as is not unusual in such cases. Strong evidence was given on the part of the defendant to show that the plaintiffs had not usefully applied their own invention, but that they had used the mules of other persons.

Lord Campbell left it to the jury to say whether the plaintiffs' invention was new and useful, and whether the defendant had infringed it.

The Jury found their verdict on all the issues for the defendant.

PALMER'S CANDLE-WICKS.

Court of Exchequer, July.—Sittings at Nisi Prius before the Lord Chief Baron and a Special Jury.

PALMER *v.* WAGSTAFF.

MR. M. SMITH and Mr. Webster conducted the case for the plaintiff; and Mr. Bramwell, with Mr. Willes, appeared for the defendant.

This was an action to recover compensation in damages for the alleged infringement of a patent for making candles with plaited wicks. It appeared that the plaintiff, whose candles have of late come very much into vogue, some years since took out a patent for an improvement in the manufacture of candle wicks, but that after having obtained the patent, he had only made a few dozens, and had not since acted upon it, except for the purposes of the present trial, nor had he ever sold the candles so made.

The Chief Baron, in leaving the case to the jury, said, that in legal language it was a fraud on the law of patents for any person to take out a patent with a view to the obstruction of improvements by another. That was just the case where a man was proved to have taken out a patent and never to have published it to the world, either by his own act of manufacturing the article under its specification, or by granting licenses to others to carry out the improvement which the invention so patented was said to have produced. One object of the invention was the production of a candle with a plaited wick, so that it would not require to be snuffed; but it would appear that prior to the patent there had been candles made which possessed the same quality. Well, then, this patent had been taken out, had never been acted upon or published to the world by the patentee, and then, some years afterwards, when an improvement in respect of plaited wicks to candles was put forth by the defendant, he came down upon him with this action for damages. The jury would say whether any damage could have been sustained by a man who had never done anything under the patent, with the exception of obtaining and enrolling it.

The jury, interrupting, said they had for some time arrived at the conclusion that the plaintiff had not sustained any damage.

The CHIEF BARON then said, that being their opinion, all they would have to do would be to consider whether they were satisfied that the candle made by the defendant was similar to that proposed to be made under the plaintiff's specification. If it was, then they ought to give some damages—a farthing or 40s. would, perhaps, satisfy the issue.

Upon that issue the jury at once returned a verdict for the plaintiff—damages one farthing.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

WILLIAM TATHAM, of Rochdale, Lancaster, machine-maker. *An improved mode, or improved modes, of preventing accidents on railways.* Patent dated October 13, 1852. (No. 362.)

This invention relates, in the first place, to a method of enabling a station-master, or other person in charge, to set a stationary apparatus, whereby the steam may be either partially or wholly shut off, the breaks applied to the tender or carriages, and the whistle or other signal sounded, all at the same time, and by the steam machinery apparatus. This method consists in arranging machinery in the following manner:—A length of rail is laid down between the permanent rails, one end of which works about a centre, while the other rests upon a cam. This cam is attached to a transverse shaft which lies at right angles to the rail mentioned. Outside of the permanent rails, on the end of the transverse shaft, is fixed a lever, which is directly connected with the hand lever. When, therefore, the hand-lever is moved, the cam is turned up, and the rail thereby raised and brought in contact with rollers working upon rods which are connected with the whistle, &c.

The invention relates, in the second place, to an improved arrangement of self-acting machinery or apparatus, part of which is stationary on the permanent way, and part attached to the engine tender or carriages, by which self-acting machinery or apparatus the steam may be shut off, the breaks applied, and an alarm-signal given. These things being effected in Mr. Tatham's apparatus, by means of a friction-pulley on the end of a fixed lever, either when two trains are approaching, or when part of a train of carriages becomes detached while ascending an incline, in consequence of the connecting links or chains breaking.

And, in the third place, the invention relates to a means by which a guard may either partially or wholly shut off the steam when any danger occurs either from fire or other causes. Upon the tender, and also upon each of the carriages, are fixed rings, rollers, pulleys, or some similar apparatus, through which a chain or cord is passed, connected between the different carriages by means of spring hooks, or other similar contrivances, the extreme length of the chain or cord, including the hooks, being equal to the length of the train. This chain or cord communicates with the steam valve and whistle, and is under the control of the guard.

WILLIAM EDWARD NEWTON, of Chancery-lane, Middlesex. *Improvements in atmospheric engines.* (A communication.) Patent dated July 5, 1853. (No. 20.)

The inventor claims,

1. A mode of using air as a motive power, consisting in the employment of a receiver in which air is highly compressed, heated, and maintained at an uniform pressure, in combination with a suitable working cylinder and piston with the ordinary appendages. Also an air-pump or air-pumps, worked by the engine, which supply the receiver, and suitable devices for working the air expansively according to the degree of compression of the air.

2. Supplying the air-pumps with dense or compressed air from a reservoir filled by the exhaust air, and by air forced in by an additional air-pump, so as to work the engine at high pressure when desirable.

3. A contrivance for regulating the pressure of the air in the receiver and economizing the power of the engine, such contrivance consisting of a bent rod retracted by a spring or weight, so acted upon by the pressure of air in the receiver as to open or close the supply valves of the air-pumps.

4. A method of forming the eduction valve of the air-pump of a dish shape, so as to require a very small bearing, thereby forming a balance-valve, so that the back pressure from the air-receiver will not prevent the valve from opening.

JEAN BAPTISTE PASCAL, of Lyons, France. *Improvements in obtaining motive power.* Patent dated January 5, 1853. (No. 21.)

This invention consists in the employment as a motive power, of a combination of steam, air, and gas. The fires are fed with compressed air, and a pipe also conducts compressed air into the furnace above the fire, which, mixing with the gas, passes through the tubes of the boiler, and is led off by a pipe to the driving cylinder. Before it reaches the cylinder, however, steam is admitted into the pipe from the steam-chest, and consequently the piston is driven by the combined forces of the three substances.

The inventor has not taken the pains to specify his claims with that precision which is necessary.

GUSTAVE EUGENE MICHEL GERARD, of No. 12, Rue Hauteville, Paris, France, manufacturer. *Improvements in manufacturing and treating caoutchouc.* Patent dated January 5, 1853. (No. 22.)

This invention is based upon the fact that caoutchouc, when heated to about 220° Fahrenheit, during a certain time, is susceptible of receiving and retaining a greater extension than in its natural state. The improvements consist—1. In processes for

applying this principle to the manufacture of various articles. 2. In combining ornamented caoutchouc with non-elastic, or partially non-elastic, tissues for the production of imitations of oilcloth and leather.

Claims.—The application of heat at a certain temperature for giving a non-elasticity to caoutchouc. Also the improvements just mentioned.

GUSTAVE PAUL DE L'HUYNES, of 21, Frith-street, Soho-square, M.D. *Certain improvements in medical portative electro-galvanic apparatus.* Patent dated January 5, 1853. (No. 23.)

These improvements consist in forming a portable electro-galvanic battery with a plate of red copper, or of any other negative metal, isolated from a plate of zinc, but in communication with it by means of a piece of cloth saturated with the electro-motive water, and in uniting this battery to another of the same kind by putting in communication the copper (or any other negative metal) pole of any element with the zinc pole of another element, and so on for increasing the number of batteries. The strength of the apparatus is doubled by setting a copper, or any other negative metal plate between two zinc plates, taking care for the developing of the electro-galvanic current that the negative metal plate should not have any direct contact with the zinc plates, and to have these last plates united together.

The electro-galvanic bath is composed of a solution of chloride of sodium, hydrochlorate of ammonia, and sulphate of copper.

Claim.—The construction of a portative medical galvanic apparatus, by combining relatively one with the other, a negative with a positive metal as described.

THOMAS SHILTON, of Baddesley Ensor, Warwick. *Certain improvements in weighing-machines.* Patent dated January 5, 1853. (No. 24.)

In Mr. Shilton's machine the article to be weighed is placed upon a platform or scale-dish beam, and the weight is indicated on a graduated lever scale-beam, or a graduated index placed along the side of the machine, by means of a sliding ball. The platform or scale-dish is supported at the four corners by uprights, the feet of which rest upon four knife-edges placed on the ends of the graduated scale beam and lever, which are united at the centres, so that both have a similar action.

Claim.—The first motion graduated scale-beam weighing with one quadripetal platform resting thereon.

CHARLES FREDERICK WHITWORTH, of Brighton, Sussex. *Improvements in apparatus to be used in connection with railway signals for the purpose of indicating the approach of trains, and of preventing collisions.* Patent dated January 5, 1853. (No. 25.)

This invention relates.

1. To an arrangement for indicating when a train passes a signal-post. A lever is placed so that one end of it is depressed by the wheel of the carriage in passing, whereby the other end is raised, lifting with it a slotted rod, and thereby liberating a horizontal bar that was previously retained against the upper end of the slot by a shoulder wrought upon the upper side of the bar. This horizontal bar, thus liberated, being dragged by a weight connected to it, carries two wires with it, one of which gives motion to the signal while the other rings the alarum.

2. To means for preventing locomotive or other carriages from crossing from one pair of rails to another, except when the danger-signal is set. This is effected by connecting the switch-rod with the above-mentioned horizontal bar, so that when the latter moves the former is allowed to move also.

FRANCIS EDWARDS, of 26, Park-place, Toxteth Park, Lancaster, enameller. *Improvements in the method of lettering, figuring, and ornamenting the surface of enamel used for dials and other purposes.* Patent dated January 5, 1853. (No. 26.)

The object of this invention is to perform this process, which is ordinarily done by hand, by transferring printed impressions to enamel, they being printed with suitable oil on a glutinous material formed into thin sheets. The groundwork of the design to be executed being thus obtained in oil on the surface of the enamel, finely-ground enamel, or metallic oxides are then dusted over the surface, part of which the oil, being viscous, retains, while none adheres to the remainder of the surface. The design thus produced in enamel or oxide, may then be fixed in a suitable furnace or kiln. Or printed impressions on paper made with a peculiar kind of ink, formed by mixing powdered enamels or metallic oxides with a suitable oil, may be transferred at once by a method of charging the surface of the enamel with spirits of turpentine, and then fixed, as in the former case.

Claim.—Transferring to enamel impressions printed in suitable oils or inks, obtained from engraved plates, or by other means, to serve instead of painting such work on the enamel by hand.

FREDERICK ARNOLD, of Devonport, Devon, ironmonger. *Improvements in heating the water in a bath or other vessel.* Patent dated January 5, 1853. (No. 27.)

This invention consists in placing a heater or boiler adjacent to the bath or other vessel, and connecting it therewith by means of several pipes; the water in the

heater or boiler being made hot by burning gas. The heater or boiler is surrounded by a case, and tubes, open below and close at the top, rise up into it, so that as the heat from the gas ascends into these, the heating surface is increased. The gas is passed through wire gauze, or some such material.

Claim.—The mode of heating water in a bath or other vessel by gas apparatus, as described.

HERBERT NEWTON PENRICE, of Sheffield, Lieutenant Royal Engineers. *Improvements in propelling vessels.* Patent dated January 5, 1853. (No. 28.)

In this invention a crank attached to the driving-shaft carries two rods on which the propelling blades are arranged, and which always move in opposite directions. This is effected by making the crank with two arms, placed on opposite sides of the shaft. It may be readily seen that by this means one of these rods may be made to immerse itself as it moves aft, and to emerge from the water on the back stroke. This being the case with each of them, a continuous pushing against the water is produced, and the vessel is propelled. It is evident that the number of pairs of rods may be increased, as may the propelling surfaces also. The guides for the rods are of course made capable of a motion about a horizontal axis.

Claim.—The mode described of combining machinery or apparatus for propelling vessels.

WILLIAM BARDWELL, of 4, Great Queen-street, Westminster, Middlesex. *Improvements in treating sewage waters and matters.* Patent dated January 5, 1853. (No. 29.)

This invention consists in constructing a building, having at its basement or ground-floor a filter-bed within a close chamber, into which the sewage-waters and matters flow from the sewers. From the floor or filter-bed within this chamber are suspended trays or shelves, covered with sawdust or other matters, moistened with dilute sulphuric acid. The floor or filter-bed is supported by beams or bearers of iron coated with zinc; and in order to obtain the pressure of the atmosphere upon the matter on the filter-bed, the under part of the filter is so arranged that the air may be withdrawn by means of air-pumps or otherwise. The floor on the top of the filter-bed is to be of some strong perforated substance, as iron or zinc, that it may bear the matters shovelled upon it. Below this are arranged strata of filtering media, through which the water passes, leaving the solid matter behind it. This is to be thrown or otherwise raised on to a floor above, and there mixed with other matters suitable for making manures; and it will be convenient to have a third floor above, for keeping a supply of such matters as are to be mixed with the sewage waters before they are led away through channels appropriated to the purpose.

EMILE GRILLET, of Soho-square, Middlesex, gentleman. *Improvements in renewing the teeth of files.* Patent dated January 6, 1853. (No. 30.)

Mr. Grillet operates upon old files in the following manner. The grease or dirt, if very thick upon them, is roughly rubbed off, and they are then immersed for four hours in a bath composed of unslaked lime, potash, and water. They are then removed, brushed, and washed in water, and placed in dilute sulphuric acid, out of which they should be taken five or six times, being each time plunged into water and brushed as before.

Claim.—Renewing the teeth of files by the action of acid substantially as described.

WILLIAM LOUIS SHERINGHAM, of Southsea, Hants, Captain Royal Navy. *Improvements for illuminating buoys and beacons in harbours, roadsteads, and rivers.* Patent dated January 6, 1853. (No. 31.)

The inventor proposes to lay down wires and tubes leading to the buoys and beacons along the bottoms of harbours; the tubes for conducting the gas, when that is used, and the wires to convey the electric currents for lighting the same. He also proposes by electrical means to light naphtha lamps, when these are used; and in some cases to dispense with both gas and naphtha, and burn electric lights.

The inventor has not separately declared his claim.

EDWARD HUTCHINSON, of Tyldesley, Lancaster, corn-miller. *Certain improvements in the mode or method of preparing, cleaning, drying, and otherwise treating wheat, pulse, seeds, and other grain.* Patent dated January 6, 1853. (No. 32.)

Mr. Hutchinson proposes to use steam instead of water for the purpose of cleaning grain. He incloses a wormed cylinder in a second one formed of wire sufficiently fine to prevent the grain from falling through it. The whole of this is confined in a steam-tight case. The grain to be cleansed is introduced into the wire cylinder through a pipe, and the wormed cylinder by revolving drives it along to the other end, the steam meanwhile softening and removing the dirt; it is then led away through a second pipe.

Claim.—The use of steam for preparing and cleansing wheat, pulse, and other grain.

EDME AUGUSTIN CHAMEROY, of Paris, France, manufacturer. *A new composition of different metals or metallic substances.* Patent dated January 6, 1853. (No. 35.)

This invention relates to the production of a new metallic compound which is said to possess the several qualities of solidity, hardness, facility of soldering, melting at low temperatures, and tractibility in moulding to any form, whilst its nature is peculiarly unchangable. This is manfactured by melting 1 part of some easily fusible metal in a cauldron, and then mixing with it 4 parts of some far less readily fusible metal pounded into fine particles, and previously steeped in a solution of ammonia. When well mixed, the compound may be poured out, and is then ready for use.

Claim.—The system or mode of manufacturing solid metals from disintegrated metallic particles, soldered or bound up together by another easily fusible metal.

Robert Whinerey, of Liverpool, Lancaster, leather merchant. *Certain improvements in or upon the manufacture and treatment of leather, either alone or in combination with other materials.* Patent dated January 6, 1853. (No. 36.)

The inventor claims—

1. The use of hydrate of soda and chloride of sodium, or a sulphuret of lime for "unhairing" skins or hides.

2. The use of an alkali, or acid, or of both, for preparing the same for tanning.

3. The use of an alkali in combination with the substances before mentioned, or an acid, alkali, or neutral salt, either separately or in combination, for tanning or preserving the hides.

4. "Blooming" the leather by means of a soluble salt of lead, or a barytic salt dissolved with any suitable colouring matter, and afterwards immersing it in, or washing it over with sulphate of soda, or diluted acid.

5. Filling the pores of the leather with the materials above mentioned.

6. The staining or blackening the surface of the leather with a solution of a salt of a peroxide of iron in combination with an acid, or an alkali, or both.

7. Attaching, combining, or connecting hide or leather together, or with other animal substances, or with vegetable or mineral substances by any of the above methods.

William Edward Newton, of Chancery-lane, Middlesex. *Improvements in roving, spinning, or twisting cotton, or other fibrous substances; denominated "Larwill's improvements.* (A communication.) Patent dated January 6, 1853. (No. 38.)

The object of this invention is to give a direct twist to the strand or thread before it is laid on the bobbin or spool, and to maintain this twist during the process of winding on, without giving a reverse twist to a portion of the length, as is the case in the ordinary processes.

Claim.—The carrying of the roving roping thread or yarn from the drawing or holding rollers through the centre of the bobbin, or spool, or hollow spindle thereof to the flyer, or its equivalent, and thence in the reversed direction to the body of the spool or bobbin on which it is to be wound.

William Edward Newton, of Chancery-lane, Middlesex. *Improvements in the construction of bearings or steps for shafts, turntables, or movable platforms; denominated Parry's improvements.* (A communication.) Patent dated January 6, 1853. (No. 39.)

The novelty claimed in this invention consists in making the rollers used for turntables, &c., in the form of double frustrums of cones joined together at their bases, and travelling in corresponding grooves, instead of forming them of single conical frustrums as is commonly the case. The object of this is to prevent the rollers from being forced out from the centre by the downward pressure.

Peter Graham, of Oxford-street, Middlesex. *Improvements in the manufacture of carpets and other piled fabrics.* (A communication.) Patent dated January 6, 1853. (No. 41.)

The first part of this invention consists in giving to the pincers which work the pile wires such motions that they shall not only withdraw the wires and carry them back towards the reeds, to be again inserted as heretofore, but also carry forward the wires, and hold them in position with their proper edges upwards until they are secured. The pincers are so arranged as to prevent collision with the shuttle-box, and a guide or guides are applied, which move towards and from the breast-beam in unison with the pincers, and successively receive the wires as they are withdrawn from the cloth, and carry them back to the point where they are to be inserted in the open shed of the warps, and guide and support them as they pass therein. Long horizontal guides are also employed to guide and support the pile wires as they pass between the warps, so that the wires may slide upon them as they enter the warps. A box or holder is also applied for holding the pile wires at the fell of the cloth with their proper edges upwards when liberated by the pincers. The second part of the invention relates to the motion for giving off the warp, and taking up the cloth; and consists in applying tension weights, and breaks on arms extending from the whip roller or frame whereby such apparatus is made more sensitive to the action of the yarn.

In addition to the above, the patentee claims the application of a bar or guide in combination with the pile wires, which

shall successively press against the said pile wires, to keep them in a proper position during the operation of cutting.

William Sykes Ward, of Leeds, York, Esq. *A thermostat, or apparatus for the regulation of temperature and of ventilation.* Patent dated January, 6, 1853. (No. 42.)

The inventor claims the combination of metallic vessels having a flexible surface, and filled with a volatile liquid and its vapour, and apparatus for the purpose of obtaining motive power from the varying tensions of the vapour, and for communicating such power to regulate ventilators, dampers, or valves.

William Watson, the younger, of Leeds, York, manufacturing chemist. *Improvements in apparatus for the manufacturing of prussiate of potash.* Patent dated January 6, 1853. (No. 43.)

This invention relates to the removal from the iron pots used in the manufacture of prussiate of potash of the mixture of animal matters and fused potash, either by forcing this semi-fluid substance up through a tube dipping therein into an open vessel, or else by forming a vacuum in this receiving vessel, and so drawing the mixture up into it. Any solid matter attempting to pass up the tube is intercepted by a thin plate of iron placed across the end of it.

Claim.—The mode described of emptying the materials used in the manufacture of prussiate of potash from the vessels in which they have been subjected to the action of heat, by means of tubes or passages communicating with such vessels through which these materials are forced by the pressure of air, gases, or vapours.

Charles de Bergue, of Dowgate-hill, London, merchant. *Improvements in the permanent way of railways.* Patent dated January 7, 1853. (No. 44.)

This invention relates to permanent ways, to be formed of cast-iron chairs and flat-bottom or bridge rails, and wooden sleepers. It consists,

1. In making the chairs with holding clips or snugs, so formed and placed upon them as to take hold of or clip both sides of the lower part or bottom flange of the rail when the ends of the chairs are horizontally moved or shifted in opposite directions, or when one end only is horizontally moved or shifted.

2. In forming such chairs with shoulders or recesses perpendicular, or nearly so, to form bearings for the keys for fastening the rail to the chair.

3. In fastening the rails in such chairs by means of keys driven perpendicularly, or nearly so, and so as not only to fasten the rail in the chair, but also to be held by the sleeper which carries the chair.

4. In casting chairs with a clip or snug at one end, and a shoulder at the other, and in securing the rail to the chair by means of a separate adjustable clip or holding piece, and by one or more bolts and nuts which fasten the chair, rail, and adjustable clip firmly together.

Thomas Pape, of Loughborough, Leicester, glove manufacturer. *Improvements in circular frames, and in the fabrics or articles produced thereon.* Patent dated January 7th, 1853. (No. 45).

This invention consists in constructing circular looms or frames for the manufacture of hosiery goods, with hooks arranged so as to allow of their turning over when pressing off the work, instead of with needles and presser-bar, and their accessories, as in the ordinary construction of such machinery. Instead also of the ordinary loop-wheel, the patentee makes use of a wheel with grooves cut round it, in which are placed levers or blades, the front points of which have nibs formed on them similar to those of the ordinary sinker, and these take the thread from off the bobbins and lay it between the hooks when forming the loops.

Claims.—1. The several arrangements and combinations of apparatus in the formation of circular frames or looms, of hooks, levers or saddles, loop-wheel and levers or blades, all as described.

2. The fashioning of gloves, stockings, drawers, and other fabrics, by means of expanding and contracting rims or frames, arranged and constructed in a peculiar manner described.

3. The manufacturing of gloves, stockings, drawers, and such other articles, either fashioned or straight, and without a seam, by means of the arrangements and combinatious of machinery described.

William Beales, of Louth, Lincoln, engineer. *An improved cement for the resistance of fire.* Patent dated January 6, 1853. (No. 46.)

The substances used in this cement and their several proportions, by measure, are as follows:—Chalk, 60 parts; limestone, or lime, 20 parts; salt, 20 parts; Bawsey sand in dust, 10 parts; iron-dust or filings, 5 parts; red or blue clay, 5 parts. These are mixed together, reduced to powder, and then calcined and packed for use.

Claim.—The manufacture of an improved cement for the resistance of fire by combining the ingredients given above, but not necessarily in the same porportions.

Charles William Lancaster, of New Bond-street, Middlesex, gun manufacturer. *An appendage to bullet moulds.* Patent dated January 7, 1853. (No. 47.)

This invention consists in adapting and

applying to the inside of the orifice of the mould, through which the lead is poured, an eccentric cutting edge, or cutting tool. After the mould has been filled the cutter is brought into action, and the bullet is perfectly formed when it leaves the mould. The inventor describes an instrument adapted to the formation of "Minié" bullets. In this the cutter is formed with an orifice placed not in its centre, but eccentrically, and through this the molten metal is poured when casting the bullet. The lower part of the orifice is formed with a cutting-edge; so that when the mould is filled, and the cutter caused to rotate by the turning of the handle attached to it, the superfluous metal is cut off, and the form of the bullet completed.

Claim.—The appendage to bullet-moulds for cutting off the refuse metal from the bullet, constructed and acting in the manner described.

George Stewart, of Enniskillen, Fermanagh, Ireland, gentleman. *Improvements in railways, and in the propulsion of engines, carriages, and other vehicles thereon.* Patent dated January 7, 1853. (No. 48.)

This invention relates to so arranging the rails of railways, and the vehicles of the locomotive engines and carriages at work thereon, that such rolling stock may be taken up and down inclines with greater security than at present, whilst superior facilities are afforded for stopping such rolling vehicles at pleasure, and for enabling the locomotive to start with a train without serious risk of slipping on the rails. These several ends are accomplished by forming teeth on the flanges of the engine or carriage-wheels for gearing into similar teeth wrought on racks, either laid alongside of the permanent rails, or forming part of them.

Claims.—1. The system of constructing and arranging the fixed rails and rolling stock of railways in the manner and for the purposes described. 2. The application and use of fixed teeth on or alongside the fixed rails of railways, to gear with corresponding teeth on the flanges of the engine and carriage-wheels. 3. The system of arranging railways with toothed racks or rails at the parts before referred to. 4. The application and use of angular or inclined rack and wheel teeth for the purposes described.

Richard Gittins, of 2, Thayer-street, Manchester-square, Middlesex. *Improvements in tills.* Patent dated Jan. 7, 1853. (No. 50.)

The inventor applies an apparatus to the counter, or other cover of a till, consisting of a series of small compartments covered with glass, into each of which the money received may be introduced through an opening at the back. At the bottom of these compartments is a platform, turning on axes at its ends, but weighted so as to give it a tendency to remain horizontal, or closed, although each compartment has money in it. By this arrangement the money received from several customers may be kept in sight as long as the tradesman pleases.

Hezekiah Marshall, of Canterbury, Kent, architect. *Certain improvements in the transmission and emission of air and sound.* Patent dated Jan. 7, 1853. (No. 51.)

Mr. Marshall claims a method of admitting air into a building through openings so covered as to prevent the return of the air; and, connected with this, a method of emitting the air through a single outlet. Also the adaptation and application of the same principle to musical instruments.

John Abraham, of Birmingham, machinist. *A new or improved method of manufacturing percussion caps.* Patent dated Jan. 8, 1853. (No. 55.)

Mr. Abraham claims the manner of cutting the blanks so as to avoid the production of waste scrap. Also the raising and cutting the edges of the caps by piling the blanks in a tube, underneath which the slide or feeder works, which slide or feeder has a horizontal motion. When the recess of the slide is in the proper position, the plunger or die descends, and forcing the blank through a cylindrical part of the recess, raises the blank into a cap, and delivers it into a holder. And, lastly, the pressing of the detonating composition contained in percussion caps by weighted or spring levers.

William Henderson, of Bow-common, Middlesex, manufacturing chemist. *Improvements in manufacturing sulphuric acid and copper from copper ores, reguluses, and matts.* Patent dated Jan. 8, 1853. (No. 57.)

This invention consists in treating copper ores of all descriptions containing sulphur, and reguluses or matts of copper, so as to obtain sulphuric acid from them, in addition to the copper and other products usually obtained. The inventor claims,—

1. The combination of kilns or sulphur ovens, or hot cylinders, with calcining furnaces, for the purpose of oxidising the sublimed sulphur in such a manner as to insure its complete conversion into sulphuric acid in the subsequent operations.

2. The use of nitrous acid, with or without the use of dry ores, for the purpose of converting the sublimed metals which are mixed with the sulphurous gases into a higher degree of oxidation, and thereby

facilitating their separation before passing into the vitriol-chambers.

3. The use of dry condensing-chambers between the furnaces and kilns and the vitriol-chambers, for the purpose of freeing the sulphurous gases from their condensible impurities, and thereby producing sulphuric acid of greater purity.

4. The short and economical process described of producing sulphuric acid and copper from sulphuret copper ores, where the impurities are of small amount.

FRANCIS PARKER, of the firm of William Parker and Sons, of Northampton, boot and shoe manufacturers, and WILLIAM DICKS, of Leicester, boot-maker. *Improvements in boots and shoes, and that kind of spatterdashes termed antigropelos.* Patent dated Jan. 8, 1853. (No. 59.)

This invention consists in employing two descriptions of flexible elastic manufactures in the making of the uppers of the above-mentioned articles. The first of these manufactures is formed by cementing a piece of leather either to another piece of the same material or to a piece of woven or other fabric. The second is formed by cementing two pieces of a woven or other fabric together. For these purposes India-rubber cement is employed, and small distended strips of India-rubber are placed between the two surfaces, so as to give an elastic character to the material.

Claim.—The manufacture of boots, shoes, and antigropelos by applying the two classes of elastic flexible manufactures described above. The inventor does not claim the method of forming the above materials.

RICHARD WALKER, of Birmingham, Warwick, percussion-cap manufacturer. *An improvement in the manufacture of buttons.* Patent dated January 8, 1853. (No. 60.)

The object of this invention is to effect a reduction in the cost of manufacturing buttons, by substituting a cement for the paper which is now used as a filling material for the shells of buttons. The cement is to be forced into the shells by means analogous to those now employed in the manufacture of percussion caps.

Claim.—The application to the manufacture of shell and other buttons, of any cheap material capable of being so far pulverized as to be readily passed through a fine sieve; such material being used for filling or packing the shells of buttons.

CHARLES STEWART DUNCAN, of Charing-cross, Westminster. *Improvements in rendering bottles, jars, and other like receptacles air and water-tight, and for raising and measuring the liquid contents thereof.* Patent dated January 10, 1853. (No. 62.)

The method employed by Mr. Duncan of rendering bottles, &c., water-tight, and of raising fluids in them is as follows:—A metal collar, with a square thread-screw formed around it, is cemented to the neck of the bottle, and upon this the cover is screwed. Upon the cover is secured a piece within the neck of the bottle, round which piece a ring or collar of gutta-percha, caoutchouc, or cork, is placed and securely affixed thereto: this collar being in fact, the stopper of the bottle. A wormed hole is formed through the cover, into which a fountain extending nearly to the bottom of the bottle is screwed, and to the bottom of this a piece of cork, gutta-percha, or some such elastic substance is fixed. Now, supposing the bottle to be partly full of liquid, the fountain empty, and the cork, or other substance at the end of it to be in close contact with the bottom of the bottle, it is evident that the fluid could not now run out, although the bottle were inverted. Suppose the cover to be now partially unscrewed, the air will necessarily pass down the fountain, and then ascend around it, filling the increased space above the fluid in the bottle; then, upon screwing the cover down again, the air within the bottle being pressed upon will force the fluid up the fountain as required.

For measuring the fluid, the upper edge of the bottle and the lower edge of the cover are bevilled, and the bevilled edge of the neck of the bottle is graduated, and has a hand placed so as to point to the different figures according as the fountain is charged by unscrewing the cover. The inventor describes other modifications of his plans.

Claims.—The mode set forth of raising, measuring, and discharging the liquid contents of bottles, jars, and other like receptacles upon the principle of hydro-pneumatics, in combination with mechanical arrangements described.

MICHAEL FITCH, of Chelmsford, Essex. *Improvements in ovens.* Patent dated January 10, 1853. (No. 64.)

Mr. Fitch proposes to combine a series of baking compartments one above the other, the partitions or divisions between the successive compartments being made hollow, so that the heat from below may pass into such hollow spaces, and be given off to the articles baking below, as well as to those in the compartments above, there being flues or passages between the successive hollow partitions or divisions, so that the heat rising from the lower parts of the series may pass into the next in succession, so long as it continues sufficient to bake.

Claim.—The mode of applying heat to ovens one above the other, as described.

WILLIAM WEBB, of Princes-street, Spitalfields. *Improvements in the manufacture of*

carpets. Patent dated January 10, 1853. (No. 65.)

The improvements in this case consist in causing all the worsted yarns to appear on the two surfaces of the carpet, the linen warp being in the interior, and the two surfaces being corded, so as to have the appearance of terry weaving on both sides, which effect is produced by means of thick weft thrown in on either side of the linen or central warp in sheds opened in the worsted warps. An ordinary thinner or fine weft is used in the linen warp which binds all parts together, and weaves the linen warp into a fabric.

John Davie Morries Stirling, of the Larches, Camp-hill, Birmingham. *Improvements in the manufacture of percussion caps.* Patent dated January 10, 1853. (No. 66.)

This invention consists in substituting zinc, covered or plated with tin, britannia metal, and other ductile alloys of tin, and zinc covered with silver, for copper and alloys of copper, at present employed in such manufacture. The mode of manufacturing is however the same as that ordinarily followed and well understood in the trade. The patentee prefers to employ zinc, coated by pressure, with tin or its alloys, or with silver, as described in the specifications of his patents of January 31, 1851, and December 22, 1851.

Frederick Schneider, of Berne, Switzerland. *A chair to be employed for preventing sea-sickness.* Patent dated January 10, 1853. (No. 67.)

The object aimed at in the construction of this chair is to preserve it in a constantly horizontal position whatever may be the motion of the vessel. This is effected by means of balance weights attached to a lever, or otherwise connected to the chair, by which it is kept in a state of equilibrium.

The patentee gives also a description of a couch constructed with a similar view, and claims the adaptation of the principle described as applicable to chairs or couches for the purpose of balancing them and preventing sea-sickness.

Alfred Vincent Newton, of Chancery-lane, mechanical draughtsman. *An improved mode of separating substances of different specific gravities.* (A communication.) Patent dated January 10, 1853. (No. 68.)

According to this invention the separation of the substances is effected by the action of currents of water induced by the vibratory motion in water of a pan for containing the substances, constructed with a bottom of wire cloth, and jointed at or near one end to a sustaining rod or axle, and at the other end supported by rods or links from a crank-shaft, which is caused to revolve by hand or other power. The downward motion of the pan with the substances to be separated resting on it, causes the water to pass in small jets through the meshes in the bottom of the pan, and to lift up and float the substances placed on it, and the currents of water induced by the vibratory motion of the pan will therefore effect the separation of the substances, and cause the heavier particles to be delivered at one end of the pan, and the lighter over at the other. The apparatus is mainly intended for separating copper ores from their earthy matrix, but is equally applicable for operating on other materials.

Claim.—Separating substances of different specific gravities by means of a pan with a perforated bottom working in water with a vibratory motion on an axle at or near one end, and communicated by a crank or its equivalent at or near the other end, as specified. (This apparatus is identical with one patented November 12, 1852, by Mr. George Stenson, of Northampton, for separating gold from auriferous earth and sand, and already in extensive operation.)

Joseph Beattie, of Lawn-place, South Lambeth, Surrey, engineer. *Certain improvements for economizing fuel in the generation and treating of steam.* Patent dated January 11, 1853. (No. 69.)

The inventor claims,—

1. Certain arrangements and combinations of two or more furnaces and combustion chambers, and apparatus for supplying cold and heated air and steam, so as to promote a more perfect combustion of fuel than heretofore in locomotive, stationary, and marine engine boilers.

2. The arrangement and combination of apparatus for condensing the exhaust steam, and for cooling and reducing the temperature of the water, in which the exhaust steam has been condensed, so as to render it fit for the purposes of continual use in the condensation of steam.

William Weild, of Manchester, Lancaster, engineer. *Certain improvements in looms for weaving.* Patent dated January 11, 1853. (No. 70.)

The inventor describes and claims,

1. The construction of a jaw or nipping temple, in which the nippers, by an outward and inward motion, alternately seize and release the cloth, when the inward motion is nearly completed.

2. The employment of the ordinary roller temple, so as to answer the double purpose of stretching the cloth and taking up, by communicating to the roller a positive motion.

3. The construction of a letting-off motion for delivering the warp from the yarn-

beam, in which a spur-wheel is keyed on to the axis of the yarn-beam, the teeth of which wheel gear into those of another wheel keyed on to a bar or roller, over which the yarn passes in its passage to the reed; the bar or roller being supported on double-armed levers, one at each end, which are free to oscillate on the axis of the yarn-beam, and which are weighted so as to keep a sufficient stretch on the yarn.

HENRY CONSTANTINE JENNINGS, of Great Tower-street, London, practical chemist. *Improvements in separating the more fluid parts of fatty and oily matters.* Patent dated Jan. 11, 1853. (No. 71.)

The inventor employs a crystallised carbonated alkali in removing the oleine, with its colouring matter, from raw palm oil, cocoa-nut oil, or other fatty matters. Sulphuretted hydrogen is then got from the partially-formed soap by the use of water and lac sulphur, or flowers of sulphur, after which the soap becomes sensibly whiter. Common salt is then added until the soap is completely separated and rises to the surface, when it is removed and cooled to the atmospheric temperature. The soap is now returned into the steam-vessel, and mixed with sulphate of alumina and potassa, and sulphate of magnesia, and the mixture is heated to 150° Fah., and stirred until a double decomposition takes place, and an insoluble soap of alumina or magnesia is formed. The water being drawn off, the mass is mixed with pearl-ashes dissolved in water, then heated and stirred until the whole becomes creamy, after which the temperature is to be increased to 212° Fah., and then cooled, salt being subsequently added and stirred into it. Naphtha, or some other cheap hydro-carbonate, is then mixed with the mass, and after this the whole is filtered, or the more liquid parts separated from the solid by centrifugal force, for which purpose Mr. Finzel's patent apparatus answers well. A mixture of sulphuric, nitric, and tartaric acids and water is now well mixed with the heated saponaceous matter, and when the whole of the fatty matter has risen to the surface, it must be removed into another vessel, cooled, and washed with water to free it from adhering acids. After this a weak solution of ammonia or of carbonate of ammonia is added, until the whole becomes liquid and white, when it is filtered, and afterwards has common salt added to it until the oily matter rises to the surface. When this has cooled and become partially solid, it is passed through two steam-heated iron cylinders, by which, or by any other suitable means, the liquid oil is removed.

Claims.—1. The use of crystallised salts, lac sulphur or mineral sulphur in powder, mineral naphtha, oil of schist, or any other cheap liquid hydro-carburet, at the particular stages and in the manner described.

2. The application and employment of iron cylinders heated by steam, and covered with flannel or any other tissue to extract the oleine from the products above mentioned.

3. The conversion of the soda or potassa soap into an earthy, metallic, insoluble soap, such as that of magnesia, alumina, or any other metallic salt having an affinity for colouring, and having a white oxide.

JAMES THORNTON, of Derby, mechanic, and JOHN THORNTON and ALBERT THORNTON, of Melbourne, Derby, mechanics. *Improved nets and other textile fabrics to be used for gloves and other purposes, and for the machinery to be employed in the manufacture thereof.* Patent dated January 11, 1853. (No. 72.)

The inventors claim certain new manufactures, the peculiar characteristics of which are that they are made by lapping one or more of a series of warp-threads (if silk or other materials) round each of a series of *passive threads*, and by extra occasional throws of the said warp-threads connecting these passive threads together to any desired order, in twos, or in larger groups, according to the character of the net or fabric to be produced. They also claim the manufacture of cords and other fabrics rendered elastic by India-rubber thread, with a surface either wholly or in part of cut or uncut foile. And lastly, they claim the peculiar arrangements of machinery by which the above are produced.

JOSEPH ROBERT WILKIN ATKINSON, of Leeds, York, flax spinner. *Improvements in machinery for preparing and spinning flax, tow, and other fibrous substances.* Patent dated January 11, 1853. (No. 73.)

The novelty of this invention consists in a peculiar combination of known parts of machinery. 1. The sliver, as it comes from cans, or suitable holders, is drawn out by rollers, between the two pairs of which there is a revolving cylinder, or endless band of inclined hackle points. 2. The extended sliver is caused to descend into the trough and become saturated. 3. The sliver in passing to the spinning-machine is drawn out by rollers, and again extended in its wet state, and is thus spun. It is the combination of these three processes which the inventor claims.

THOMAS COTTRILL, of West Bromwich, Stafford. *Improvements in the manufacture of certain salts of soda.* Patent dated January 11, 1853. (No. 74.)

This invention consists in the addition of the proto-carbonate of iron to the vat liquor obtained by the solution of the products of

the black ash furnaces in the manufacture of soda ash, whereby the sulphuret of sodium contained in that liquor is decomposed, and the carbonate of soda is formed.

JOHN PETRIE, junior, of Rochdale, Lancaster, ironmonger, and SAMUEL TAYLOR, of the same place, mechanic. *Improvements in machinery or apparatus, for washing or scouring wool.* Patent dated January 11, 1853. (No. 75.)

The object of these improvements is to substitute mechanical means for hand labour in the operation of washing wool. According to the patentee's plan, the attendant is only required to place the wool on a travelling endless band, which conveys it forward into the washing trough, into which it falls, and is immediately forced downwards beneath the surface of the liquid by a rotating plunger or fan-wheel, which also serves to push or carry it forward under the operation of a vibrating fork or frame, which is mounted horizontally in the vessel, and as it moves up and down agitates the wool in the liquid. The stirring or agitating operation is farther assisted by two other vibrating frames furnished with plungers or teeth, and so mounted and actuated that they have also the effect of carrying the wool forward to the end of the trough, from which, when it has been thoroughly washed, it is lifted out of the water by a rotating drum armed with teeth, whereby it is deposited on a second travelling endless band which carries it forward to a pair of squeezing rollers, by which the water is squeezed out, and the wool then allowed to fall into a receptacle placed below.

The patentee claims the general combination of parts described, or any mere modification thereof, whereby the entire operation is effected; also the use of the rotating plunger, and the vibrating or reciprocating arms for agitating the wool in the trough; and further, the exclusive use of the lifting-drum, wheel, or frame, whether employed alone or in combination with any of the other parts.

ENGLISH SPECIFICATION ENROLLED.

THOMAS FILDES COCKER, of Sheffield, York, wire, steel, and file manufacturer. *For certain improvements in annealing or softening metallic wires and sheets of metal; also in reducing, compressing, or drawing metallic wires; also in the manufacture of metal rolls.* Patent dated Jan. 11, 1853.

The patentee describes and claims,—

1. The annealing or softening of metallic wires and sheets of metal by immersing them in a heated bath of melted lead or other fused metal, either in direct contact or enclosed within a casing or chamber from which the air is excluded.

2. The reducing, compressing, or drawing of metal wires (when such wires are circular in their cross section) by the use of four cylindrical cast-metal steel rolls, arranged either two vertically and two horizontally in close proximity, or with their peripheries grooved, and these grooves meeting at a common centre, so as to form a circular aperture through which the metal is drawn or forced.

3. The manufacture of metal rollers for rolling iron, composed of a wrought iron, malleable cast iron, or cast steel shaft or mandril, with an outer casing of metal cast on or around the said mandril or shaft.

PROVISIONAL PROTECTIONS.

Dated February 5, 1853.

322. André Michel Massonnet, of Paris, France. Certain improvements in alloys of metal, and of other substances, and also in the application of the same to various useful purposes.

Dated May 21, 1853.

1258. William Chisholm, of Holloway, Middlesex, chemist. Improvements in the purification of coal-gas for the purposes of illuminating and heating, and obtaining by the ingredients used therefor manures, salts of ammonia, and sulphur.

Dated May 30, 1853.

1326. George Wells, of Upper East Smithfield, Middlesex, engineer. The combination of materials for making a more perfect fabric for suction-hose, mill-bands, harness, and for all other similar purposes to which the same may be applied.

Dated June 7, 1853.

1394. George Barett Colvin Leverson, of St. Helen's-place, London, merchant. A new application, construction, and arrangement of springs for carriages and such like purposes. A communication.

Dated June 13, 1853.

1434. Gonsal Auguste Hiacinthe Justin Fremin, of Rue de l'Echiquier, Paris, France, gentleman. Certain improvements in the construction of steam-boats.

Dated June 23, 1853.

1526. George Louis Stocks, of Limehouse-hole, Poplar, Middlesex, ship-chandler, and Thomas Watson, of Buttesland-street, Hoxton, rose-engine turner. Improvements in the construction of ships' square sails, and in the method of reefing the same.

1527. Noel Natalis du Chastaingt, of Rue Rochechouart, Paris, France, chemist. An improvement in bread-making.

1528. James Burrows, of Haigh Foundry, near Wigan, Lancaster, engineer. Certain improvements in the construction of steam boilers or generators, and in the arrangement of furnaces connected therewith.

1529. James Burrows, of Haigh Foundry, near Wigan, Lancaster, engineer. Certain improvements in the formation of such metallic plates as are required to be conjoined by riveting or other similar fastening.

1530. Thomas Weatherburn Dodds, of the Holmes Engine and Railway Works, Rotherham, York, engineer. Improvements in the manufacture of files, rasps, and other edge tools usually made of steel.

1532. Joseph Aspinall, of Old Hall-street, Liverpool, broker. A self-adjusting stamp. A communication.

1533. Masta Joscelin Cooke, of the Tyne Manure and Chemical Works, Glasshouse-quay, Newcastle-on-Tyne, gentleman. An improved mill and apparatus for crushing and grinding bones, grain, and other compounds.

Dated June 24, 1853.

1534. Joshua Horton, jun., of Brierly-hill, Stafford, engineer and boiler-manufacturer. An improvement or improvements in steam boilers.

1535. Joseph Rock, jun., of Birmingham, Warwick, factor. An improvement or improvements in spring or clasp-knives, applicable to such other articles as shut or close after the manner of clasp-knives.

1536. Noble Carr Richardson, of South Shields, Durham, founder. An improved capstan.

1537. George Sands Sidney, of the Willows, Brixton-road, Surrey, gentleman. Improvements in jugs or vessels for containing liquids.

1538. John Webster, of Ipswich. Improvements in the distillation of fatty and oily matters.

1540. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in obtaining motive power. A communication from MM. Guichené and Burgalat.

1541. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in the production or manufacture of flour. A communication from M. Bairoz.

1542. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in machinery or apparatus for cutting paper and similar materials. A communication from M. Pfeiffer.

1543. James McConnell, of Hazeldean, Renfrew, North Britain, bleacher. Improvements in the consumption or prevention of smoke.

1544. John Lyle, of Glasgow, Lanark, North Britain, manufacturer. Improvements in the manufacture of figured or ornamental fabrics.

1545. Henry Goodall, of Derby, druggist. Improved machinery or apparatus for grinding or levigating various substances.

1546. Leon Valls, of Paris, France, merchant. Improvements in the production of printing-surfaces. A communication.

Dated June 25, 1853.

1547. Daniel Illingworth, Alfred Illingworth, and Henry Illingworth, of Bradford, York, worsted-spinners. Improvements in machinery or apparatus for combing wool, cotton, flax, silk, and other fibrous substances.

1549. John Emanuel Lightfoot, of Accrington. An improvement in the manufacture of certain colouring matter to be used in dyeing and printing.

1550. George Josiah Mackelcan, of Lechlade, Gloucester, agricultural-implement maker. Improvements in winnowing or corn-dressing machines.

1551. Alfred Sandoz, of the firm of Sandoz, Brothers, of Ponts, Switzerland. An instrument or apparatus which he terms a solar watch. A communication from the inventor, Philipe Henri Matthey Doret, of Locle, Switzerland.

Dated June 27, 1853.

1552. Robert Harlow, of Stockport, Lancaster, brass-founder. Improvements in constructing and working valves for baths, washstands, and other purposes.

1553. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of Fleet-street, London, patent agent. Improvements in printing or in producing designs and patterns on stuffs and fabrics. A communication.

1554. William Fairclough, of Stockport, Lancaster, machine-smith. Certain improvements in looms for weaving.

1555. John Mason, of Rochdale, Lancaster, machinist, and Luke Ryder, of the same place, mechanic. Improvements in machinery or apparatus for preparing and spinning cotton and other fibrous substances.

1556. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. Improved apparatus for manufacturing resin-oil. A communication.

1557. George French, of Bandon, Ireland. Improvements in axles or axletrees.

Dated June 28, 1853.

1558. John Jarman, of Manchester, Lancaster, commercial traveller. Improvements in apparatus for measuring corn, pulse, seeds, or other produce usually sold by dry measure.

1560. Alexander Brown, of Glasgow, Lanark, North Britain, manufacturer. Improvements in the manufacture of cotton fabrics for ladies' under dresses.

1562. Auguste Édouard Loradoux Bellford, of Castle-street, Holborn, London. Improvements in magneto-electric machines. A communication.

Dated June 29, 1853.

1564. Thomas Edward Irons, of Market-gate, in Arbroath, North Britain, last-maker. Improvements in the manufacture of lasts, and in machinery connected therewith, parts of which machinery are also applicable to other like purposes of eccentric turning.

1566. Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, London, and Rue de l'Echiquier, Paris. Improvements in the construction of furnaces. A communication.

1568. Robert Moore Sievier, of Louviers, France, but now at Manchester, Lancaster, manufacturer. Improvements in the manufacture of piled fabrics, and in machinery for effecting the same.

1570. George Arthur Biddell, of Ipswich, engineer. Improvements in apparatus for cutting vegetable and other substances.

1572. James Tatlow, of the firm of J. and W. Tatlow, of Wirksworth, Derby, smallware manufacturer, and Henry Hodgkinson, of the same place, mechanic. Improvements in smallware looms.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," July 8th,* 1853.)

293. William Scarlett Wright. An improved bath.

(*From the "London Gazette," July* 12*th,* 1853.)

313. William Walker. Certain improvements in apparatus to be employed for the purposes of drying.

319. Antoine Wollowicz. Improvements in primers for fire-arms.

322. André Michel Massonnet. Certain improvements in alloys of metal, and of other substances, and also in the application of the same to various useful purposes.

382. Peter Armand Lecomte de Fontainemoreau. Improvements in the mode of giving flexibility to beds, sofas, seats, and other similar articles. A communication.

385. Francis Clarke Moustis. An improved mode of raising water.

426. William Darling. Improvements in the manufacture of malleable iron and other metals.

430. James Chadnor White. Improvements in fastenings for harness, and which are also applicable to other like purposes.
442. William Pidding. Improvements in coverings for the feet of bipeds or quadrupeds
496. James Murphy. Improvements in trucks, wagons, or vehicles for railway purposes.
577. John Hall and John Crofts. An improvement or improvements in revolving or repeating fire-arms.
598. William Pidding. Improvements in the treatment or manufacture of caoutchouc or gutta percha, in fabrics obtainable therefrom, and in the machinery or apparatus employed therein.
599. George Chambers. Improved means of gathering cinders and depositing ashes under fire-grates, securing economy in fuel, and cleanliness of appearance.
622. Peter Armand Lecomte de Fontainemoreau. A new or improved apparatus for filtering liquids. A communication.
803. Francis Steigewald. Improvements in the manufacture of glass and porcelain.
805. Francis Steigewald. Improvements in heating furnaces.
825. Henry Leachman. Improvements in the manufacture of iron. A communication.
846. William Moseley. A new method of railway traction, to be called a "pony railway."
955. Richard Archibald Brooman. Improvements in inhaling-tubes. A communication.
1155. Jacob Brett. Improvements in electric-telegraph apparatus. Partly a communication.
1258. William Chisholm. Improvements in the purification of coal-gas for the purposes of illuminating and heating, and obtaining by the ingredients used therefor manures, salts of ammonia, and sulphur.
1310. William Henry Bentley. Improvements in locks and keys, parts of which are applicable to window-sashes and doors.
1326. George Wells. The combination of materials for making a more perfect fabric for suction-hose, mill-bands, harness, and for all other similar purposes to which the same may be applied.
1353. Richard Longden Hattersley. Improvements in machinery for forging iron and other metals.
1364. James Mayelston. Certain improvements in the manufacture and refining of sugar.
1403. Antoine Ponçon. Certain improvements in obtaining motive power.
1422. Richard Archibald Brooman. Improvements in the manufacture of paper. A communication.
1451. Jules Dehau. Manufacture of yarn, and fabricating articles therefrom.
1452. Jules Dehau. Improvements in the manufacture of woven fabrics, yarn, cordage, ropes, paper, and pasteboard, by the application of a material not hitherto used in Great Britain for such purposes.
1457. Timoléon Zoé Louis Maurel. Certain improvements in horological alarms.
1463. James William Gibson. A new method of pavement tending to secure the evenness of the road and proper adhesion to the foot.
1473. Solomon Solomon and Samuel Mills. Improvements in axle-boxes for locomotive engines, railway and other carriages, applicable to the bearings of machinery.
1476. Auguste Édouard Loradoux Bellford. Improvements in machinery for pulverizing and washing quartz or ore, and for amalgamating the gold contained therein. A communication.
1482. William Hall. Improvements in ship-building.
1489. James Heginbottom and Joseph Heginbottom. Improvements in spinning.
1490. James Shanks. Improvements in the manufacture of alkali from common salt.
1498. George Young. Improvements in grinding wheat and other grain.
1501. Robert Midgley. Improvements in preparing and finishing certain worsted yarns, and in apparatus employed therein.
1509. Richard Cornelius. Improvements in the construction of churns for producing butter.
1523. Francis Huckvale. Improvements in hand-hoes.
1524. William Geeves. Improvements in the manufacture of bricks.
1533. Masta Joscelin Cooke. An improved mill and apparatus for crushing and grinding bones, grain, and other compounds.
1536. Noble Carr Richardson. An improved capstan.
1527. George Sands Sidney. Improvements in jugs or vessels for containing liquids.
1538. John Webster. Improvements in the distillation of fatty and oily matters.
1548. Antoine Andraud. Certain improvements improvements in railways and locomotives running thereon, which improvements facilitate the ascension of steep inclines.
1549. John Emanuel Lightfoot. An improvement in the manufacture of certain colouring matter to be used in dyeing and printing.
1551. Alfred Sandoz. An instrument or apparatus which he terms a "solar watch." A communication.
1553 Richard Archibald Brooman. Improvements in printing or in producing designs and patterns on stuffs and fabrics. A communication.
1566. Peter Armand Lecomte de Fontainemoreau. Improvements in the construction of furnaces. A communication.
1568. Robert Moore Sievier. Improvements in the manufacture of piled fabrics, and in machinery for effecting the same.
1572. James Tatlow and Henry Hodgkinson. Improvements in smallware looms.
1589. John Jaques, the younger. Improvements in the manufacture of chess-boards and chess-men.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

PATENT APPLIED FOR WITH COMPLETE SPECIFICATION.

1589, John Jaques, the younger, of Hatton-garden, Middlesex, manufacturer. Improvements in the manufacture of chess-boards and chess-men. July 2.

WEEKLY LIST OF PATENTS.

Sealed July 8, 1853.

1853:

75. John Petrie, jun., and Samuel Taylor.
87. John Capper and John Watson.
93. John Rumley.
109. John Arrowsmith.
180. John Stevenson.
312. George Letts.
421. Charles Watt and Hugh Burgess.
467. William Johnson.
765. John Carter Ramsden.

812. George Purcell.
906. John Wallace Duncan.
1010. John Hetherington, John Dugdale, junr, and Edward Dugdale.
1029. John Hetherington.

Sealed July 9, 1853.

62. Charles Stewart Duncan.
63. John Deane.
65. William Webb.
67. Frederick Schneider.
68. Alfred Vincent Newton.
898. Moses Robinson.

Sealed July 12, 1853.

78. Nathaniel Card.
82. John Arrowsmith.
88. Frederick Lawrence and Alfred Lawrence.
90. Moses Cartwright.
91. Charles Bullivant and Charles Hackney.
99. Arthur James.
286. Owen Williams.
1108. John Hetherington.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
July 1	3480	J. R. Murphy and P. Murphy	Dublin	Chair and couch.
,,	3481	D. M'Laren and J. S. Oliver	Edinburgh	Bedstead-joint.
5	3482	T. De la Rue and Co.	Finsbury	Calender.
6	3483	J. Hutton	Burton-crescent	Pencil-case.
7	3484	J. S. Stroud	Birmingham	Electric gas-burner.
9	3485	F. Dent	Strand	Annular fountain-reservoir for liquid-compasses.
,,	3486	J. Peckman	Birmingham	Shutter-fastener.
13	3487	Barnard and Bishop	Norwich	Poultry feeding-trough.

WEEKLY LIST OF PROVISIONAL REGISTRATIONS.

June 27	521	W. Redgrave	Croxley-green	Dress-preserver.
July 13	522	W. Stretton	Hackney-road	Garden engine.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1563.] SATURDAY, JULY 23, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

BRIGHT AND BRIGHT'S PATENT MAGNETO-ELECTRIC TELEGRAPH.

Fig. 2. Fig. 1.

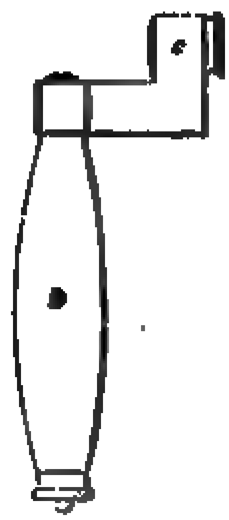
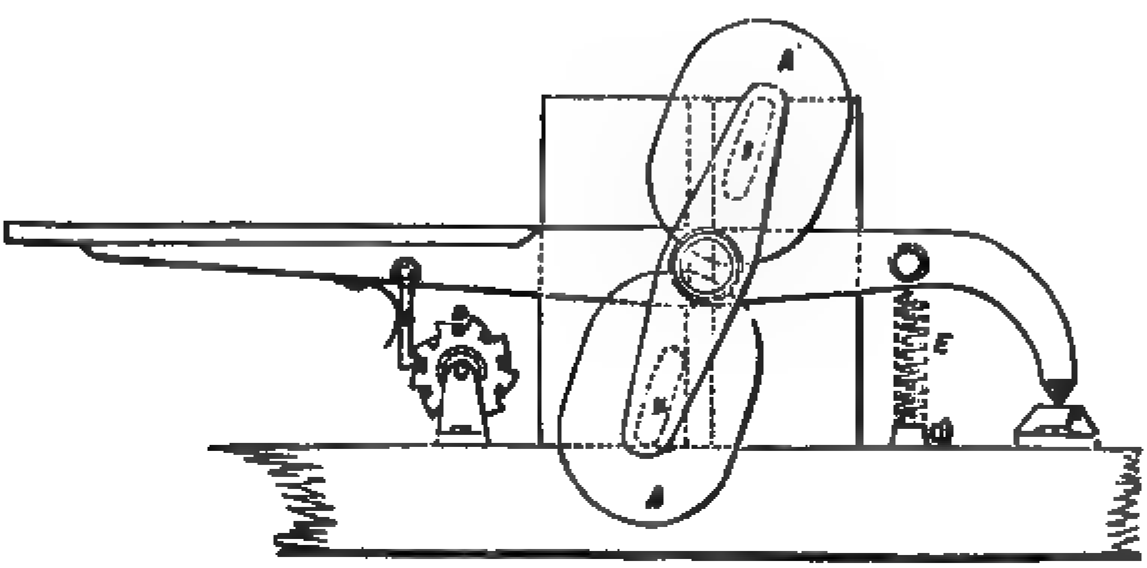


Fig. 3.



BRIGHT AND BRIGHT'S PATENT MAGNETO-ELECTRIC TELEGRAPH.

(Patent dated October 21, 1852.)

THE telegraph described in this patent belongs to that class of these instruments in which a secondary current of electricity, induced by magnetic action, is employed as the means of furnishing the moving power. Though this is as yet a new phenomenon in the associated sciences of electricity and magnetism, and has received the name of magneto-electricity, to distinguish it from the inverse process of electro-magnetism, it has become the subject of a great deal of investigation, the result of which shows that it may be applied with advantage in wire-conduction telegraphing. The inventors of the arrangement we are about to describe have applied themselves, among other cultivators of these prolific sciences, to the simplification and general perfection of telegraph apparatus on this principle, and, together with other ingenious electrical arrangements included in this patent, some of which we shall describe on a future occasion, have done so with much success. To render the positive and negative magneto-electric currents available with one conducting-wire has been the immediate object they have had in view; and the simplicity of the means employed by them appears to promise the best results in practice.

Fig. 1 represents a side view, and fig. 2 an end view of this arrangement. A A are the magnets from which the power is derived; B B are two electro-magnetic coils placed near the poles of the magnets, on an axle, C, to which is connected the handle, D. E E are two spring catches which, when pressed by the movement of the handle either to the right or to the left, slip over a cog of their respective ratchet-wheels, F F; *f*, *f*, *f*, *f*, are a series of conductors forming part of the cogs, and in metallic connection with the ratchet-wheel axles. The portion of the surface of each cog between *f* and *f* is formed of some non-conducting material, as ivory. The connections for working the apparatus are made by joining the conducting-wires and one end of the sending-coil apparatus to the conductors, *f*, *f*, *f*, of F, at the axle of the ratchet-wheel, and by connecting the earth-wire and the other end of the sending-coils with the conducting portions, *f*, *f*, *f*, of F^1. Then the spring-catches, E and E^1, being permanently connected by a wire between the spring-boxes, when the apparatus is at rest, the sending-coils will be on short circuit *viâ* F, E, E^1, F^1, and the line-wire is in the same manner connected with the earth. On the handle being moved to the right or left, the communication between F and F^1 will be broken by one or other of the catches, E E^1, passing over the non-conducting part of the ratchet-wheels, and thus the required currents will pass to the earth and along the line, and at the end of the stroke the catch moved will slip over the next cog, and put the sending-apparatus on short circuit during the return of the handle and sending-coils to their position at zero. This arrangement may be varied by having the handle permanently connected with the earth and with one end of the sending-coils, and a spring connected with the line-wire resting against the handle, with a piece of non-conducting material let into the handle on each side of the point of contact with the spring when at rest. The other end of the sending-coil being connected permanently with the metallic spring-catches, and those portions of the cogs of the ratchet-wheels which were in the previous mode of connecting conductors, must now be non-conductors, the positions of the conducting and non-conducting portions being reversed. The bodies of the ratchet-wheels being connected together permanently, and to the spring connected to the line-wire, the arrangement will be complete. When the apparatus is inactive, the line-wire is in connection with the earth through the spring and handle; and at the same time, as both of the spring-catches are resting on non-conducting portions of the ratchet-wheels, there is no circuit of communication between the sending-coils. On the handle being moved, either to the right or to the left, connection between the line and the earth is broken at the spring by one or other of the non-conducting plates on the axle of the handle being interposed between it and the handle, and one or other of the spring-catches moving over one of the conducting portions of its respective ratchet-wheel, the one sending-coil is connected with the line-wire, and the other coil with the earth, through the permanent connection to the handle. At the end of the stroke the catch slips over the next cog of the ratchet-wheel, and shuts off the sending-coil from the line-wire.

Fig. 3 represents the adaptation of the principle to keys. A double-key arrangement is given to illustrate this application. A A^1 is one of the two sets of induction-coils—a set to each key; there are two finger-keys and two ratchet-wheels, D, the non-conducting spaces being those portions of the cogs against which the spring-catches rest when

the apparatus is not at work. The body of the ratchet-wheel, D, is connected with the earth, and the other with the line-wire. E is one of two connection-springs permanently connected with their respective finger-keys, and thence to one terminating wire of each of the sending-coils. These springs are also connected respectively with the line and with the earth. F is a metal rest, extending between the springs, and upon which they rest when the apparatus is not being worked. The magnets are placed on each side, with their poles facing the ends of the coils, and metal catches are in connection with the other ends of the sending-coils. On one or other of the keys being pressed down, the coils hitherto disconnected are brought into play by the catch pressing upon the conducting part of the cog of the ratchet-wheel. On the return of the key, the coils are shut off, the catch pressing upon the non-conducting part of the cog, and the line is left in connection with the earth through the metal rest, F. The cores of the coils are indicated by dotted lines at I and K. In the figure the required break has been made, when requisite, by means of a catch and ratchet-wheel, which appears to the patentees the best for practical working. It will thus be seen that, by the use of the handle, key, or lever alone, currents of magnetism can be made use of separately, to communicate at will, either positive or negative signals along a single wire, and thus the double motions of a pointer to the right and to the left can be made use of, and the two currents of electricity derived from magnets can be applied to telegraphs generally.

THE DUBLIN EXHIBITION.—SECTION OF MECHANICS AND MACHINERY.

(From the *Civil Engineer and Architects' Journal.*)

The official catalogue made its appearance on the last day of May, nearly three weeks after the opening of the Exhibition; but as a great many goods were still not arranged, and a large part of the building not thrown open to the public, nor even glazed in, the catalogue, it may be supposed, is a very imperfect indication of what the Exhibition now contains. A "Synopsis" of the contents, by Mr. C. Adley, Assistant-general Superintendent, has since been published, which serves as a very useful guide to the visitor to the various departments, of which it gives a brief sketch, and in some instances the actions of the machinery and processes of manufacture are described.

As the internal arrangements have been gradually developed, the opinions of the general character of the Exhibition, founded on its skeleton state, have been confirmed. There are no striking features that at once arrest the attention, but on a closer examination there are to be seen great varieties of interesting objects, many of which derive peculiar importance from their representation of the manufacturing progress and the natural resources of Ireland.

The general arrangement for the display of the machinery in motion is found to operate exceedingly well. The continuous shaft, 300 feet in length, kept in rotation by Messrs. Fairbairn's engine, amply serves all the required purposes; and to drums of various sizes there are connected driving-bands, which give motion to numerous machines of various kinds, arranged down the length of the hall; comprising flour and other mills, a centrifugal pump, centrifugal drying-machines, flax-machinery, looms, spinning-machinery, machines for working in wood, for forging, and for making buttons, and planing and shaping-machines. There is little or no novelty in the many pieces of mechanism exhibited. Largest of all, and towering far above the rest, is a double-cylinder high-pressure and condensing engine, stated to be of 45-horse power, on M'Naught's principle, of first using the elastic force of steam in a small cylinder, and then making use of its condensing property by admitting the steam into a larger cylinder in connection with a condenser. An equally economical effect is obtained in a much more simple manner by working the steam expansively, as practised in the Cornish engines. The engine exhibited was manufactured by Messrs. Grendon and Co., of Drogheda; the diameter of the condensing-cylinder is 28 inches, with a stroke of 4 feet 6 inches; and the diameter of the high-pressure cylinder is 25 inches, with a stroke of 27 inches. The massive engine, with its large beam, is called "portable," as it is made to rest on plates of iron, ribbed; which plan, it is asserted, gives a more solid foundation than a structure of brickwork. It was intended in the first instance to employ this engine to turn the composite shaft that works the machinery, but in consequence of some disagreement about the matter, Messrs. Fairbairn's engines were employed. The latter, indeed, form a contrast to the large beam-engine. The power is applied directly to the crank, and the two occupy comparatively very little space. Messrs. Grendon and Co. also exhibit a locomotive engine, which has only one

companion in the Exhibition, with a stroke of 18 inches, cylinders 14 inches diameter, and driving-wheels of 5 feet 6 inches; the number of tubes in the boiler being 137. There are other specimens of engines from the same factory, which are all highly creditable to Irish workmen.

A very highly-finished portable 3-horse power steam engine, manufactured at the works of the Great Southern and Western Railway, at Inchicore, shows what excellent workmanship can be turned out in Ireland. It is employed to pump water to cisterns at the top of the building to supply the fountains. Mr. J. Shekleton, of Dundalk, contributes an 18-horse power "portable" engine, and one of 4-horse power, horizontal and high-pressure. There is also a very compact small steam engine from the works of the Irish Engineering Company. The centrifugal pump of Mr. Gwynne is the only representative of that mode of raising water; his rivals, Mr. Appold and Mr. Bessemer, having left the field entirely clear to him in Dublin. The arrangements for displaying the effective power of this pump are better contrived than it was at the London Exhibition. The water is raised to a height of 18 feet, and falls like a cascade into a large cistern; but it is far from being so well managed as Mr. Appold's was, for the water separates into streams, and presents no very imposing appearance. The power required to work it is that of ten horses, and the result seems not adequate to the power employed. The difference between Mr. Appold's pump and that of Mr. Gwynne, as shown at the Great Exhibition, consisted principally in the shape of the radial arms—those in Mr. Appold's pump being curved, and Mr. Gwynne's straight; and the space at the circumference of the disc, for the emission of water, was not so large in the latter. Whether Mr. Gwynne has adopted the curved radial arms is not stated, but the working effect of his pump appears to be improved.

Near Mr. Gwynne's pump are some agricultural machines for cutting chaff, and for grinding corn and dressing the flour. In one of the mills the flour is dressed during the grinding process. As soon as the corn is ground, the flour passes over wire-gauze openings in the lower grindstone, by which the fine flour is separated from the meal. A series of openings is also arranged in the upper stone, furnished with air-boxes facing the direction in which the stone revolves, so that the air is forced down upon the grinding surfaces, cooling the meal, and facilitating the passing of the finer flour through the wire frames in a very cool state, and thereby accelerating the process of grinding.

The machinery for dressing flax is not so extensive as might have been expected in a country where flax manufacture constitutes the staple product. There is one hackling-machine of a novel construction, in which the hackles and gills are finer at one end than at the other, so that the flax undergoes two ordinary processes of dressing at the same machine. There are also numerous specimens of flax in its various stages of progress, commencing with the old, uncertain, and noxious process of "rotting," and some in which Mr. Watts's process of preparing the flax by steam has been successfully employed.

The looms for weaving are few in number, and display little variety in construction. Most of them are worked by hand, and the only variety that was not represented in the Great Exhibition is a loom for weaving velvet, which attracts much attention to see the weaver introduce two brass wires alternately between the warp, to serve to raise the weft upon, which he cuts to make the pile, and thus liberates each wire successively. There are several looms for weaving poplins, in which the Irish manufacturers decidedly excel. Some of these looms are fitted with a number of small shuttles that throw in the patterns in varied colours. The cost of these fabrics prevents them from coming into extensive use; for though the material is a mixture of silk and worsted, the price is higher than that of the best foreign silks. In these, as in other textile manufactures, the Irish claim superiority in point of durability over the English and Scotch, and profess not to make any "spurious" goods, such as are turned out at a low price in Manchester and Yorkshire. In woollen cloths, however, they have as yet made no attempts to manufacture the finer kinds; but of tweeds and the coarser cloths, they produce very good qualities that supply Dublin consumers at as low prices as the Yorkshire weavers. In the mechanism of the looms exhibited there is scarcely any novelty. The Jacquard cards are in every instance employed to produce the patterns, notwithstanding the many contrivances which the Great Exhibition of 1851 displayed for superseding those cumbrous and expensive appurtenances to the loom. Neither the moveable pegs on a pierced cylinder nor the pliant strong paper, which promised to produce the same effects as the Jacquard cards in a less costly manner, have their representatives in 1853.

The cotton manufactures are but scantily represented in the machinery department. Mr. Mason, of Rochdale, indeed, contributes a large slubbing-frame and a roving-frame, which show his latest improvements for giving the spindles a steady and rapid

rotatory motion; but these are the only machines directly connected with cotton manufactures shown in action.

Messrs. Sharp and Co., and Messrs. Lewis and Sons, of Manchester, exhibit several engine-making machines, for planing, shaping, and boring, but on a much smaller scale than those of a similar kind sent by them to the London exhibition. There are some wood-cutting machines by Mr. Furness, of Liverpool, that show the advantageous application of machinery to execute, in a superior manner, and with great rapidity, the ordinary work of the carpenter in planing, mortising, moulding, and tenoning; and considerable space is occupied by lathes and implements for illustrating the manufacture of pearl and other buttons.

The perfection attained by Irish engineers in manufacturing machines of the smaller kind is well illustrated by a display of highly finished lathes and other implements by Messrs. Kennan and Son, of Dublin. Some beautiful specimens of work done by their lathes are exhibited, which, the manufacturers contend, surpass anything that could be produced by other lathes of similar construction and price. The reputation of these implements has caused a demand for them even in England, where the large manufacturers do not think such small works deserving their attention, and the manufacturers on a smaller scale, in London and elsewhere, charge more than those in Dublin.

The indefatigable Mr. Abel Merrall, who at the Great Exhibition was constantly at work showing crowds of spectators his plan of making twine needles, attracting them still more strongly by distributing small packets of his excellent wares, has established himself in a very conspicuous position at the east end of the machinery hall, where he has renewed his former attractions.

There are very few mechanical contrivances that present any features of novelty, and those are not remarkable for their practical applicability. Near to the printing-presses is a machine about the size of a lathe, and worked by a treddle, for the purpose of "buffing" silvered plates for the daguerreotype. The plates to be buffed are fixed on a table, and by the action of the treddle the leather buffer is moved rapidly to and fro over their surface. The contrivance is the invention of Professor Glukman. For very large plates such an apparatus may be found convenient, but it appears to be massive and costly for accomplishing an object that may be attained equally well by much more simple means.

Another contrivance that has at least novelty to recommend it, is a mode of communicating between the guard and the engine-driver of a railway train. This apparatus is also large and costly, having been fitted up in a highly-finished style of workmanship. It consists of two cylinders of different diameters placed in a line, so that the same piston-rod may, by turning a handle, work plungers in each. At the ends of the larger cylinder several whistles are fixed, to be sounded by the air forced through it; the other cylinder forms a syringe, which is supplied with water from a cistern, and a small hose is attached to it, intended to be conducted under the carriages to the engine. If in action, the guard would have the power of arresting the attention of the engine-driver by an appeal to the sense of feeling as well as of hearing. The shrill sound of the combined whistles could scarcely fail to be heard; but if deaf to them, a jet of water in the face of the driver from the water-pipe would make him quickly bestir himself, even if asleep. The ingenious inventor seems not to be aware that the practical difficulty in making communication between the guard and the driver arises from the want of means of readily attaching even a communicating wire or string from end to end of a train, owing to the shifting of the carriages; otherwise nothing could be easier than to give the guard command over the steam-whistle itself, or a jet of hot water; and most assuredly the difficulty would not be diminished by having to connect a water-tight hose.

A coining press is shown at work, striking Exhibition medals, similar in construction, though smaller, than the one at the Great Exhibition which was so employed. There are several lithographic presses also, where views of the building and other objects are printed and sold.

The department of naval architecture, but for the contributions from Somerset-house of some of the same models that were sent to the Great Exhibition, would appear equally barren with that of architecture on land. The only original large model is one of a first-class merchant steamer, executed by Mr. Clarke, jun., of the Dublin Steam-packet Company, with minute regard to every part, in a highly-finished manner. A small model of a yacht, by Mr. H. Teall, of Dublin, illustrates a novel plan of construction, by making an elongated bow serve the purpose of a bowsprit. The sailing properties of such a vessel promise favourably, as the shape nearly resembles that of the pirate vessels in the Indian seas, which are celebrated for their speed.

THE IRON TRADE.

The iron masters' meetings passed off well, indicating a sound state of trade,

notwithstanding the forebodings in connection with the recent ruinous over-speculation which has been carried on in the trade. At the first meeting held at Walsall, on Wednesday, the accounts of the small manufacturers were well met. On Thursday, the meeting at Wolverhampton was numerously attended, and favourable reports of the trade in that part of the district were made. Some brisk orders were taken, and prices upheld. The third meeting was held on Thursday, at the Town-hall, Birmingham, and was by far the most important. All the large houses in Staffordshire and Shropshire were represented, and there were numerous buyers for the home and foreign markets from London and elsewhere. The prices agreed upon at the preliminary meeting,—namely, £9 per ton for bar, and £4 to £4 10s. for good hot-blast pig-iron,—were maintained, notwithstanding the great depreciation which has been known to exist in the value of pig-iron, occasioned by speculators, and a very inferior article which has been recently introduced. One large order for rails for the foreign market was executed at £8 10s., to be delivered on board.

Glasgow Pig-iron Market.—Glasgow, July 16.—The occurrence of the annual holidays has prevented the transaction of much business since Thursday. From this cause we have had a blank market to-day; prices, however, are unchanged. For warrants, 53s. 6d. to 54s.; No. 1., 55s.; No. 1., Gartsherrie, 58s.

The Magnetism of Ships, and the Mariner's Compass; being a Rudimentary Exposition of the Induced Magnetism of Iron in Sea-going Vessels, and of its Action on the Compass in different Latitudes, and under diversified Circumstances. By WILLIAM WALKER, Commander R. N., Examiner in Navigation and Seamanship, &c. London: Piper Brothers and Co., Paternoster-row; Charles Wilson (late Wilson and Norie), Leadenhall-street. 1853.

THE three following questions may be very properly put concerning every published work that appears. 1. Is this really valuable to those for whom it is intended? 2. If not, will it prove serviceable to many others? 3. Again, if not, is it utterly worthless? If, in any given case, an affirmative answer can be honestly returned to the last of these only, the author should endeavour to bear the reproaches of the critic as humbly and as penitently as he can. If, however, the second of these queries can be replied to positively he may expect generous criticism at the least. But if the first meets with affirmation he may then honourably claim the applause due to uncommon merit. This we are happy to say Capt. Walker has secured by the production of the work before us, which is certainly well adapted to "young seamen aspiring to rise in their profession," for whom it has been prepared. It unquestionably presents a very accurate and comprehensive representation of the present state of the subject discussed, in terms which are sufficiently technical to be intelligible to seafaring men, and yet so carefully selected as to be philosophical.

Just now, unhappily, almost every subject, whatever its real character may be, is introduced into the pages of many journals with certain exaggerated epithets, of which popular journalists seem to possess a limited but much-used stock, and which are really becoming quite wearisome, and, indeed, rather annoying and injurious withal. Undoubtedly, the number of "vastly important" and "universally interesting" things that come before the public mind is very great; but nevertheless we must not permit all distinction among even these to be abolished, much less must we allow the rash elevation of things of inferior interest to an equality with those of the very highest. If we do, true scientific literature must either altogether cease, or become speedily disfigured with those hateful etymological and syntactical deformities which for some time past have diminished the power and elegance of our general literature.

Indeed the *importance* of a subject which affects the profits and the losses of a people is, we think, a thing which that people will not need to be very urgently apprised of; and we accordingly leave it to them in the present case, since all are aware of the vast interests of life and property that are staked upon the security of ocean navigation, and also of the extent to which iron is now employed in the practices of naval architecture, and of the dangerous effects likely to result from this, unless the questions brought forward in this treatise of Capt. Walker become better understood than they are at present.

The author fills the first twenty-five pages with historical matter, without which, we are bound to say, the work would have been far less complete than it now is. This is a fact that we, at least, know how to appreciate, having been far too frequently annoyed by seeing whole chapters of the most uninteresting trash dragged from obscure old books into the bodies of scientific works, probably with the intention of bringing to

the author the repute of vast erudition, though we confess that it has far oftener convinced us that either he or his *employé* had been foolishly prodigal at antique-book stalls.

We commend to our readers a careful perusal of the detail of fundamental experiments with their elucidations, given by the author between pages 42 and 57. The effects produced upon the compass by local attraction are there pointed out, and shown to be not constant, as is frequently assumed, but changeable,—varying indeed not only with the latitude of the vessel, but also with the different positions of the vessel in the same latitude. When it is remembered that not only the courses run, and consequently the dead reckoning, but also the observed bearings of heavenly bodies, and the longitude of the ship, obtained from observation (which cannot, generally, be got without the latitude by account), are affected by the errors of the compass, the existence of these variable attractions becomes of primary importance.

Another great fact referred to and established in the above-mentioned pages is, that the magnetism of different iron bodies in a ship is conducted from one to the other, if such bodies have contact with each other, or are each of them in contact with any other piece of iron, such as a knee, a pillar, a hook, rider, or any other article formed of that metal. This principle is forcibly illustrated by the author, in the following paragraph;—"The water-tanks in a ship-of-war, if stowed in actual *contact*, will act on the compass as if a single tank, of the same size as the aggregate number of small ones in the hold, occupied their places. But if the tanks be kept separate by thin slices of board, then each separate tank, &c., will retain its natural quantity of inductive magnetism, and the places of its *poles* will change with the motion of the ship."

We must here, however, correct an error into which the author has fallen, we think from inadvertence and not from misapprehension. In explaining, on page 37, a method of discovering the *magnetic dip* at any given place, by laying an iron bar in the plane of the magnetic meridian, with one end of it beside a delicately-suspended magnetic needle, and then moving the bar about that end, in the same plane, until the needle ceases to be deflected by the magnetism of the bar, he says, "the axis of the bar will then be at right angles to the direction of the magnetic dip, *or in the plane of the magnetic equator*." The words in italics can have no scientific meaning; unless, indeed, the author intends to teach us that the number of the "magnetic equators" is as infinite as the number of the places at which the experiment can be performed; which we are sure he cannot purpose teaching. Exactly the same error recurs on page 46. The fact is, the bar is then neither in the plane of the magnetic equator, nor in a plane parallel to that of the magnetic equator, unless the place at which the experiment is performed is chosen at that equator, and in that case the experiment is useless, for there the needle is necessarily horizontal, being attracted and repelled equally by the north and south magnetic poles. The method itself is an excellent one, and very well described, if the words pointed out are omitted.

Another fact to be regarded is, that the effects produced upon the compass by masses of iron are greatly dependent upon their relative positions with regard to it, since magnetic attraction, whether induced or permanent, follows the general law of attraction, varying in intensity inversely as the square of the distance. This is well illustrated by Captain Walker thus:—"A very small quantity of iron, as an iron bolt in the corner of a hatchway, or skylight, if near the binnacle, may act upon the compass as powerfully as a gun would act when secured to a port in the side of the ship, or fifty tons of iron stowed in her hold."

We cannot help supporting our author's protest against the unscientific expedients that have been resorted to, under high sanctions, for the purposes both of counteracting the dip, and checking the horizontal oscillations of the card. When the needle dips, to hang a weight upon the elevated end, and *so* to reduce it to a level position, might certainly be deemed an excusable expedient for a puzzled ploughman to resort to in exigent circumstances, but we can hardly say that it discovers eminent judgment in scientific men to have recourse to such a practice, unless, indeed, they have sought in vain for a less objectionable method; and the same remarks apply to the *weighting* of the needle in order to steady it in rough weather. Whatever may be the opinions of those in authority in the royal service of the plans substituted for them, these surely cannot but be objected to.

But notwithstanding our great admiration of Captain Walker's exposition of the principles of magnetism, and his practical applications of them, we cannot always praise his mathematical investigations. Perhaps there is nothing worse than antiquity about these, but even that is not always to be commended. We admire conservatism; but it is the conservation of the *true*, and not necessarily that of the *old*, that we are inclined to. Whatever may have been the dignity of such reasoning as the following, when dynamics dwelt in "old obscurity," we cannot reverence it now.

"It appears to me," says our author,

in discussing the amount of force required to reduce a moving body to rest, "that every effect must necessarily be proportional to the cause of that effect; and that, when a body is in motion, we must take into consideration the quantity of matter in the body, and the velocity with which it moves.

"Now the force arising from the quantity of matter in the body must necessarily be proportional to the quantity of matter; and the force arising from the velocity of the motion (as a cause) is necessarily proportional to the velocity of the motion. The whole force, then, arising from the quantity of matter, and the velocity of its motion, must be proportional to these two causes taken together; and therefore in bodies of equal weight, having equal quantities of matter, and moving with equal velocity, their momenta will be equal."

Now no mathematician could pass his pen admiringly under such paragraphs as those; the pen that belongs to a mathematician would of itself run up and go through them. We shall not enlarge upon this; our justification is to be found in every modern Cambridge work upon dynamics. The whole question may be very simply stated thus. If the *space* through which a uniform resisting force is to act upon a moving body in order to reduce it to rest be given, then the amount of that force will be proportional to the product of the mass of the moving body into the *square of its velocity*; that is, according to the usual notation, proportional to Mv^2. But if the *time* through which the uniform resisting force is to act be given, then the amount of that force will be proportional to the product of the mass into the *velocity*; that is, to Mv. Now in the case of two moving bodies reducing each other to rest by impact, the *time* through which the impulsive force acts, though indefinitely short, is the same for each, and therefore the product of the mass into the *velocity*, and not into the *square* of the velocity, is the same for each also; that is, their *momenta* and not their *vires vivæ* must be equated. We are quite confident that Captain Walker will at once assent to this reasoning.

We fear he has betrayed himself into false methods by endeavouring to popularise those scientific principles which really cannot be comprehended but by studious men. We are led to say this, because the thing aimed at is quite correct. Still, the process of attempting to state the principles of such a science as dynamics in popular language is a dangerous one, as the latter part of the last sentence of the paragraphs just quoted will demonstrate, because it is evident that the author has there added, as a notable scientific conclusion, a fact that no blockhead could doubt.

Other peculiarities in the author's mathematical reasonings and nomenclature might be pointed out, but we fear to name them, lest we should withdraw attention from the very valuable information on magnetism with which the book abounds, and fix it upon trivial defects which have neither intrinsic nor extrinsic importance.

We must not leave the work without referring our readers to its Appendix. They will find there a discussion that took place between Captain Walker and the Astronomer Royal; we wish that all great men, who rashly sanction any dangerous error, were as well and as argumentatively replied to as Mr. Airey undoubtedly was.

Finally; there will also be found in the Appendix the specification of "Commander Walker's Patent Mariner's Compass." Of this we need not say anything more than that it is formed strictly in accordance both with the known laws of magnetic action, and the circumstances of a ship at sea, and will unquestionably, ere long, supersede the many bungling modifications of the common compass now in vogue, as well as several other patent compasses, which, although all more or less ingenious, are subject to the very inconvenient defect of being constructed in order to adapt themselves to circumstances which have but an imaginary existence. It is proper to add that Capt. Walker's compass has been thus officially described to the British Admiralty; —"It is an excellent compass; in fine weather and smooth water, possessing all the quickness of any other compass; and in stormy weather, be what may the motion of the ship, it is perfectly steady, when other compasses are oscillating from 2½ to 3 points each way, and sometimes more. Neither is it affected in an oscillating movement by the firing of the guns; and from its principle the same card answers in all weathers." To such testimony we need add nothing. However long the Government may be in extending its use throughout the Royal Navy, we are quite sure that it must soon become general in our mercantile service.*

We cordially recommend the book. Its information is invaluable, while its defects, in nearly all cases, lie quite apart from the main subject, and will be found not at all to diminish the practical value of the treatise. It is in other respects well prepared; its clear type, good paper, strong binding, and copious index will all be found unusually valuable to seamen.

* A copy of the complete specification of Capt. Walker's patent compass, with an engraving of the same, will be found at page 161, vol. lvii. of our Magazine.

THE CENTRAL GAS CONSUMERS' WORKS.

The extensive works which have recently been completed at Bow Common for the Central Gas Consumers' Association are remarkable for the magnitude and economy of their productive power. They are computed to be capable of producing 800,000,000 of cubic feet of gas per annum. The retorts employed are placed in two rows of arches, an upper one and a lower. Each of the upper arches contains six clay retorts, and each of the lower arches seven iron ones. The produce of each retort per day is set down at 8,000 cubic feet. These retorts, which have a principal section of 8 feet by 19, are heated by fires three or four times smaller than those commonly in use, their dimensions being 7 inches in width by 28 in length. To assist and economize the combustion in these furnaces, the coal-tar produced by the distillation is employed as fuel, after being in the first instance conducted into convenient tanks for temporary storing. This practice is productive of an economy always desirable, and the atmosphere of the works is maintained in a state of greater purity.

There are four large gas-holders, which can jointly store nearly 2,000,000 cubic feet, and the mains have a total length of nearly seven miles. The total cost of these large works,—including a sum of about £30,000 incurred in law expenses, whilst obtaining the necessary Parliamentary powers,—has only amounted to £210,000; a cost, having regard to the magnitude of the works, unparalleled in its smallness in the history of the gas manufacture.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

John McDowall, of Walkinshaw Foundry, Johnstone, Renfrew, North Britain, engineer. *Improvements in cutting or reducing wood or other substances.* Patent dated January 12, 1853. (No. 77.)

This invention is in part a modification of the inventor's "silent feed motion," patented by him in 1852. He claims,—

1. The general arrangement and construction of machinery for cutting or reducing wood and other substances, as described.

2. The mode of effecting a silent feed or traverse motion of the wood during the process of cutting by means of angularly worked slipping frames, or holders, as described.

3. The application and use of self-acting eccentric cams, for engaging and disengaging the wood in correspondence with the backward and forward traverses of their actuating frames.

4. The application of a differential system of cam or eccentric movement for keeping up a continuous uniform feed traverse, as described.

5. The mode of working the nipping feed-apparatus by means of elliptical gearing, for obtaining a differential action.

6. The application and use of cutting, clipping, or holding-pieces, whether as applied directly to the wood to be cut or to a pulley pin, for effecting the necessary feeding movement.

7. The mode of obtaining a continued noiseless feed, by means of the successive action of the self-acting engaging and disengaging nippers; wherein the quickest mover takes up the feed, and disengages the slower one.

8. The mode of constructing rotatory cutters, wherein the narrow cutting edges or teeth are so disposed as to break joint with each other in their cutting action.

9. The mode of obtaining a roughing and finishing cutting action in one cutter, by means of alternated and reversed cutting teeth or edges; each set of which removes or cuts away the wood left in strips by the other.

10. The mode of constructing roughing cutters by locking a series of cutters in a slotted spindle, as described.

11. The mode of giving the first cut to the wood by means of cutters which take away the wood in narrow strips, in the manner and for the purpose described.

Nathaniel Card, of Manchester, Lancaster, candlewick manufacturer. *Certain improvements in candle-wick.* Patent dated January 12, 1853. (No. 78.)

The character of this invention may be seen at once from the claim, which is as follows:—The manufacturing of candle-wick by first doubling two or more single yarns together into a strand, then doubling two or more of these strands into a thread or cord, and afterwards twisting together as many of these threads or cords as may be necessary to form a wick of the required thickness.

John Hick, of Bolton-le-Moors, Lancaster, engineer. *Certain improvements in the method of lubricating revolving shafts, and their bearings or pedestals.* Patent dated January 12, 1853. (No. 79.)

This invention relates to the lubrication of all revolving shafts, the bearings and journals of which are horizontal. At or near the centre of the step of the bearing, and at about right angles to the axis of the shaft, a groove is formed in both the upper

and lower halves of it, so as to extend all round the journal of the shaft. The lower part of this groove forms a receptacle for holding the lubricating liquid, the upper surface of which should at all times be below the lower surface of the revolving shaft. There is also a small horizontal groove formed in the steps, at the height of and parallel to the axis of the shaft, which extends to within a short distance of the back and front of the pedestal. The lubricating liquid is supplied to the journal of the revolving shaft by a metal or other ring placed loosely on the shaft, which carries the ring round with it by means of the friction between their surfaces. Thus the lower part of the ring, which dips into the oil or other liquid, is constantly passed to the upper part of the shaft, carrying with it supplies of the fluid.

James Fletcher, of Facit, near Rochdale, Lancaster, manager. *Certain improvements in machinery applicable to spinning, doubling, and winding cotton, wool, flax, silk, and other fibrous materials.* Patent dated January 12, 1853. (No. 80.)

This invention relates to that class of machinery known as throstle or water-frames; and also to doubling-frames and winding-machines. The first part of it is intended to do away with the friction of the thread upon the curved surface of the front roller, which is produced in ordinary throstle-frames, and consists in the addition of another covered roller immediately in front of the fluted one, together with a change in the position of the front roller. The second part of the invention relates to the mode of imparting motion to the spindles of throstle and doubling-frames, and of winding machines, and consists principally in a re-arrangement of the existing parts of these and in a peculiar mode of banding, so as to drive two spindles, one on each side of the frame, by the same band.

Claims.—1. The improvement described in the first part of the invention, as applied to throstle-frames for spinning cotton.

2. The method described of imparting motion to two spindles by one band, in throstle and doubling frames; and also the mode of applying it to doubling frames and winding machines, which have their spindles opposite, or at right angles to the axis of the driving-rollers in machines used for cotton, wool, flax, silk or other fibrous materials.

John Arrowsmith, of Bilston, Stafford, engineer. *New or improved machinery for shaping metals.* Patent dated January 12, 1853. (No. 82.)

Claim.—The shaping of metals by the use of two plane or curved surfaces moving in opposite directions, the metal to be shaped being placed between and rolled by these surfaces which are furnished with grooves, or otherwise fashioned, so as to give the requisite form to the metal shaped between them.

George Augustus Huddart, of Brynkir, Caernarvon, Esquire. *Improvements applicable to steam generators.* Patent dated January 12, 1853. (No. 84.)

The object of this invention is to expedite the operation of generating steam by assisting the globules of steam to emerge from the superincumbent water as soon as they are formed, and also by bringing continually a fresh surface of water into contact with the heating surfaces. For these purposes the inventor introduces rotating-curved blades into the boiler, or into the tubes of tubular boilers, which blades are worked separately by motive power; and a pump which will draw water out from the boiler at one level, and introduce it again at a lower.

Claim.—The means above set forth of increasing the agitation of the water in steam generators, for the purpose above explained.

William Nairne, of South Inch Mill, Perth, Perthshire, flax spinner. *Improvements in reeling yarns or threads.* Patent dated January 12, 1853. (No. 85.)

Claim.—The placing of the bobbin that is to be reeled on a pin or frame fixed in an arm or plate made fast on a spindle, which spindle is set as far off the perpendicular position as gives a tendency to the bobbin to swing round with the arm or plate to the lowest point of the circle which that arm partly describes; and, by throwing a strap under the wipers on the shaft which drives the reel, swift, or barrel, stopping it more suddenly than if it were merely set free from the strap, band, or pinion.

Edward Haslewood, of Tufnel-park, Holloway, Middlesex. *Improvements in fire-arms and projectiles.* (A communication.) Patent dated January 12, 1853. (No. 86.)

This invention is applied to that class of fire-arms which are loaded at the breech, and also to the projectiles or balls used therewith. The improvements in the fire-arms consists in surrounding the cylinder, the axis of which is transverse to that of the barrel, and in which the charging chambers are arranged radially, with a metal band, which, being acted upon by an eccentric, tightly embraces the cylinder, and forces it up against the end of the barrel. The charging-chambers are each made with a shoulder, the outer diameter being larger than the inner, and they are slightly bell-mouthed. The ball is cast with a ring at one end, which fits into the larger diameter of the charging-chamber, while the smaller end of the ball fits into the smaller end of

the chamber. When all the chambers are charged with powder and balls, the cylinder is placed into a metal ring or hoop, which being contracted by a screw, will cause all the balls to be tightly compressed within their respective charging-chambers or breeches. The bore of the barrel is somewhat smaller than the smaller diameter of the breech, and the inner end of the barrel is formed to enter into the bell-mouth of the breech. The projecting ring on the ball will consequently be tightly pressed between the end of the barrel and the shoulder of the charging-chamber, and when the arms are discharged, will be left in the breech, the other part of the ball being driven through and separated from it.

Claims.—The combination of apparatus for receiving the charges and discharging them through a barrel common to them all; and, also, so constructing a ball or projectile, and so arranging the breeches and barrel through which they are discharged that the projecting parts or rings formed on the balls or projectiles may be removed and remain behind.

JOHN CAPPER, of Earl's-court, Old Brompton, Middlesex, merchant, and THOMAS JOHN WATSON, of Devonshire-terrace, Fulham-road, Middlesex, operative chemist. *Improvements in preparing and bleaching of jute and other vegetable fibres.* Patent dated January 12, 1858. (No. 87.)

According to this invention, jute and other vegetable fibres are purified, attenuated and bleached by being first boiled, or scalded for two hours in a chemical solution composed of any of the following substances; viz., soda, carbonate of soda, chloride of soda, muriate of soda, oxide and hydrate of soda, carbonate of potassa, chloride of potassa, bitartrate of potassa, nitrate of potassa, oxide of potassa, hydrate and hydrated oxide of potassa, carbonate of ammonia, nitrate of ammonia, or sulphate of magnesia. It is then removed and suspended upon laths or ropes, that the water may drain off from it; after which it is transferred to a bleaching-bath, prepared by the mixture of chloride of lime, soda, or magnesia with cold water, in which it remains for twenty-four hours. It is then withdrawn, washed in water, and dried, and is then ready for the market.

Claim.—The treating of jute and other vegetable fibres as described.

FREDERICK LAWRENCE and ALFRED LAWRENCE, of the City Iron-works, Pitfield-street, Old-street Road, Middlesex. *Improvements in sluices and lock-gates.* Patent dated January 12, 1858. (No. 88.)

In this invention apparatus is so arranged that the head of water is made to assist in opening or closing the sluice or gate, by means of a piston or pistons connected with it, against which the head of water acts when communication, which may be regulated by one or more valves, is opened with the low level.

JOHN BENNETT, of Bradley Mills, Huddersfield, York, woollen manufacturer, and HENRY CHARLESWORTH, of Huddersfield, York, card manufacturer. *Improvements in doffing and preparing rovings of wool.* Patent dated January 12, 1858. (No. 89.)

This invention consists in employing only one doffing cylinder to a carding and condensing engine, which cylinder has a rotary motion, but no traversing action, and is covered all over with sheet or fillet cards. The wool is fed into the carding engine in separate slivers, and these pass through it in the same condition, without taking wool or giving it to each other.

MOSES CARTWRIGHT, of Longton, Stafford, merchant. *An improvement or improvements in the preparation or manufacture of gypsum, or plaster-of-Paris.* Patent dated January 13, 1858. (No. 90.)

The chief peculiarity of this invention consists in stirring the powdered sulphate of lime by machinery, instead of by manual labour, in the following manner:—A horizontal cog-wheel placed above the cistern and driven by an engine, communicates motion to a vertical shaft, which carries any number of horizontal arms at its lower end, to which arms the stirrers are attached.

Claim.—The boiling or dehydrating of natural or hydrated gypsum by heating the powder of the same in a fixed circular or nearly circular cistern, which is closed, or partially closed, and heated by flues, the powder being stirred by stirrers driven by machinery, as described.

CHARLES BULLIVANT, of Birmingham, Warwick, manufacturer, and CHARLES HACKNEY, of Balsall-heath, near Birmingham, Warwick, mechanic. *An improvement or improvements in certain kinds of spoons or ladles.* Patent dated January 13, 1858. (No. 91.)

Claim.—The making of spoons and ladles having bowls of earthenware, porcelain, glass, or other vitreous or semi-vitreous substance, and handles of metal or other material less brittle than that of which the bowl is made, however such bowls and handles may be united. Or, the addition of such handles as the aforesaid to such bowls as the aforesaid.

WILLIAM BROWN, of Glasgow, merchant. *An improved method of treating coal and bituminous substances; and for improvements in the treatment of their volatile products.* Patent dated January 13, 1858. (No. 92.)

The first operation under this patent consists in distilling the coal or other bitu-

minous matter in conjunction with steam heated by coal. After this, the volatile products thus obtained are again subjected to distillation, during which, impure eupion oil, heavy oil containing paraffine, and impure paraffine are produced, and are received and treated separately by methods almost identical with those previously described at length in our Magazine, under the patent of Mr. Young, of Manchester. (*See* Vol. liv., page 334.)

Claims.—1. The use of steam, heated as indicated, for the purpose indicated.

2. The mode or modes described of purifying eupion oil, lubricating oil, and paraffine, obtained by the process or processes described.

John Rumley, of South Shields, Durham. *Certain improvements in pumps.* Patent dated January 13, 1853. (No. 93.)

The peculiarity of this invention consists in imparting motion simultaneously in opposite directions to two spear-boxes, so as to produce a continuous instead of an intermittent flow. This is effected as follows:—two equal rods are attached to the framework of the pump, one on each side of the shaft, both of which are free to move in a plane perpendicular to that in which any point of the crank revolves. To the extremity of each of these rods two others are jointed, one of which goes up to the connecting-rod, while the other goes down to a shaft, through which a smaller shaft, which is attached to the connecting-rod, works. Upon the lower end of each of the shafts a spear-box is carried. It will be readily seen, that while motion is communicated to the crank, there must always be one of these spear-boxes ascending and one descending. When the pump is required to be double, cross-heads, carrying two shafts each, are placed instead of the shafts themselves; the same method of working one shaft within the other being retained.

Claim.—The combining of the spear-boxes of pumps with the above mechanical arrangements.

Edward Wills Uren, of Walkhampton, Devonshire. *The manufacturing of bricks, pipes, tiles, imitation stone, and peat bricks for fuel, by the means of a machine and arrangements of machinery, titled a central, circular and horizontal motion.* Patent dated January 13, 1853. (No. 94.)

Claims.—1. The manufacturing of bricks, pipes, tiles, and imitation stone, and of bricks for fuel, by means of a machine in which the plastic materials of which such articles are to be formed are forced from a receiving cylinder or mill, by means of a cone armed with screw blades, into boxes and through moulds or dies, in the manner described.

2. A particular arrangement of the screws, wheels, segments, and cogs for the purpose of propelling and withdrawing the slides.

3. A certain arrangement of screws for receiving the plastic material, and forcing it through dies or moulds.

4. An arrangement of levers and inclined planes for cutting off the moulded materials into lengths.

John Walker Wilkins, of Hampstead, Middlesex, electric telegraph engineer. *Improvements in electric telegraphs, and in the instruments used in connection therewith.* Patent dated January 13, 1853. (No. 96.)

Mr. Wilkins claims,—

1. The arrangement of electric telegraph apparatus in such manner as to give motion to a marker or tracer, held continuously in contact with a moving recording surface, and thereby to mark or produce upon such surface characters or signs indicating letters, words, or figures, and connected together in a continuous line.

2. Moveable terminations to fixed magnets, for the purpose described.

3. The construction of electric telegraph insulators, with tubes of glass or other material arranged concentrically around the core from which the electric conductor is suspended, and having spaces between them, so as to form an extended non-conducting surface between the point of suspension of the conductor and the connection of the insulator with its support.

Arthur James, of Redditch, Worcester, manufacturer. *Improvements in means for enclosing needles.* Patent dated January 14, 1853. (No. 99.)

This invention consists in simply forming folding wrappers for placing needles in, of various prescribed shapes.

William Steads, of Redcross-street, Leicester. *Improvements in blinds, maps, charts, and other articles wound on rollers.* Patent dated January 14, 1853. (No 101.)

The object of this invention is to dispense with racks and springs employed usually in apparatus used for the rolling and unrolling of the above-named articles. To effect this, the cord passed over the pulley of the roller is weighted so as to be in equilibrium with the article which is rolled or unrolled by simply moving the weighted cord.

Isham Baggs, of Liverpool-street, engineer, and Frederick Joseph Bramwell, of Millwall, engineer. *Improvements in steam machinery used for driving piles, hammering, stamping, and crushing.* Patent dated January 14, 1853. (No. 102.)

The machinery described under this patent is an ingenious modification of the steam-stamp and pile-driver, patented by Mr. Baggs 29th January, 1852, and de-

scribed at length in our Magazine, vol. lvii., p. 89. In its original form the machine has been found to fulfil its intended purposes very efficiently; and it only remained to add the improvements now under notice to render its working perfect. The driving power is completely under control; and by a clever arrangement, which we regret the absence of the illustrative drawings precludes our giving at length, the force of the blows is tempered with a degree of nicety hitherto attainable only in the most delicate and complicated constructions of steam machinery. The nature of the improvements will be readily understood by the following extract from the patentees' specification.

This invention consists in combining a steam-engine with suitable pile-driving, hammering, stamping, or crushing instruments, in such manner that the steam may be first used on a smaller piston surface, and then expansively on a larger piston surface. The construction of engines for this purpose may be varied in form, so long as this principle is retained. A very convenient arrangement is to have a fixed steam-cylinder, the piston-rod of which (which may be hollow) is of considerable diameter compared to that of the steam-cylinder, and to which the pile-driver, hammer, or stamping or crushing instrument is applied. In this arrangement the steam-valve is constructed so as to admit the steam below the piston to lift it, and then to open a passage for the steam to act on the larger area of piston above, and cause the instrument to descend to do its work. The invention includes also an arrangement for tempering the force of the blow by adjusting the slide valve, so as to admit a larger or smaller proportion of steam into the cylinder as may be required.

There are no specific claims.

JAMES STEWART KINCAID, of Dublin, gentleman. *Improvements in ascertaining and registering the number of persons entering or quitting omnibuses or other vehicles or vessels; which improvements are applicable, in whole or in part, to buildings or other places.* Patent dated January 16, 1853. (No. 103.)

The chief object of this invention is to produce a turnstile which shall occupy less room than those ordinarily used. The inventor therefore constructs one in two parts, placing one of these on each side of the entrance of the vehicle. In the first arrangement described, each arm is attached to a vertical tube, which turns freely on a shaft, and gives motion to a bevel-wheel, and thereby to a horizontal axis, which has a worm upon it arranged so as to work the index-wheel. There is a second bevel-wheel above the first, for the purpose of turning the wormed shaft when the arm is moved in the opposite direction. These bevel-wheels are worked by means of pauls attached to the shaft, and placed so as to pass over the stops on the under wheel when they take against those on the upper, and *vice versâ*. The vertical tubes are connected below by an endless chain, and a spring is made to act upon bosses on the tubes, for the purposes of regulating the strain and bringing the turnstiles to rest.

The inventor also describes a second arrangement, which is a modification of the above, as applicable to omnibuses.

Claim.—The adaptation and application to omnibuses, or other vehicles, of the turnstile in two parts, or two turnstiles as described. Also, the general arrangement of mechanism described when adapted and applied to other uses.

HIPPOLYTE CHARLES VION, of Paris, France, and Holborn, London, chemist. *Certain improvements in apparatus for refrigerating.* Patent dated January 15, 1853. (No. 106.)

The inventor so constructs his apparatus, that in the process of refrigeration the latent heat which is absorbed by the vaporized gas may be taken only from those substances whose temperature it is required to reduce, so as to allow it to be continually collected, and used for producing the same effect.

Claims.—1. The application of cold, produced by the evaporation of liquids and liquefied gas by the aid of mechanical means.

2. A particular combination of apparatus described.

JAMES HADDEN YOUNG, of College-street, Camden-town, Middlesex. *Improvements in brooms or brushing apparatus.* Patent dated January 15, 1853. (No. 107.)

Mr. Young constructs a hand-sweeping machine thus:—The two wheels on which the whole apparatus is to run are made by means of a driving-band or chain, to give rotary motion to a circular brush, which sweeps the dust up into a pan provided for it. The whole is covered with some material not impervious to air, and yet of a texture not sufficiently open to allow the dust to pass through it.

Claim.—The peculiar combination of the parts into an apparatus for sweeping, as described.

JOHN ARROWSMITH, of Bilston, Stafford, engineer. *Certain new or improved pumping machinery.* Patent dated January 15, 1853. (No. 109.)

Claim. — Constructing pumping machinery by connecting together the pistons of two or more steam-cylinders by means of chains and pulleys, or racks and pinions,

so that the pump-rods shall balance each other, the said cylinders being situated immediately over the pit or well, and the piston-rods being prolonged so as to form the pump-rods of the machine.

THOMAS POTTS, and JAMES SEPTIMUS COCKINGS, both of Birmingham, Warwick. *Improvements in the manufacture of tubes, and in the application of tubes to certain purposes.* Patent dated January 17, 1853. (No. 110.)

The first improvement in manufacturing tubes is carried into effect as follows:— The patentees cast a billet hollow, and of a triangular section, containing a sufficient quantity of metal to form the intended tube; they next roll this billet, in a heated state, on a triangular mandril, and then pass it through another set of rolls, while still hot, by which it is caused to assume a section approaching the cylindrical, the diameter of the tube being increased so as to allow the mandril to be easily withdrawn. This last operation is repeated as often as necessary, until the metal is reduced to the desired thickness and length, the top rolls being screwed down closer at each repetition of it. Finally, the tube is brought to a cylindrical form in a common draw bench, this being done when the metal is in a cool state.

The second improvement relates to the process for manufacturing calico printing-rolls, which are required to have a longitudinal projection in their interior. The patentees take a flat plate of copper or other metal of the required dimensions, the width being equal to the circumference of the finished roller; they then plane the edges with shallow grooves, and bring the flat plate to a circular form by hammering and swages, and then by drawing or rolling until the edges meet and take firm hold of a slip or strip introduced between them, which is to form the nib or projection. This is further secured by soldering on the interior; and in order to complete the roll, and give it a finished appearance, it is drawn through a collar, by which the joints are rendered close and nearly imperceptible.

The third improvement consists in the employment of hollow or tubular copper wire for telegraphic purposes, and also in a mode of using short lengths of tubing for connecting such telegraphic conductors together.

Claims.—1. The making of solid or seamless tubes, as described.

2. The making of tubes or printing rolls, as described.

3. The application for telegraphic communication of hollow wire, as also the means of jointing the same.

THOMAS CROPPER RYLEY, of the Haigh Foundry, near Wigan, Lancaster, engineer, and EDWARD EVANS of the same place, engineer. *Certain improvements in the construction of wrought-iron wheels to be used upon railways and for other purposes, and in the machinery or apparatus connected therewith.* Patent dated January 17, 1853. (No. 111.)

This invention includes not only wheels of all descriptions used on railways, but also wheels of other classes, the nave and spokes of which are required to be made of wrought iron.

The improvements consist; first, in so rolling the spoke iron that the ends which are to form the nave shall be of a sufficient thickness to admit of their being reduced by means of suitable cutting machinery or compressed by hydraulic or mechanical pressure at once into the exact segmental form required to constitute a portion of the nave (when bent and the ends brought together), without the necessity for any subsequent operation of filing or otherwise fitting; second, in cutting or pressing the ends of the spokes into the requisite segmental form; and, third, in the use of suitable cutting or pressing machinery for effecting the said object.

The patentees put their improvements in practice as follows:— they roll a bar of iron of any convenient length, so as to form as many spokes in one bar as practicable, having thickened parallel parts, or "swells," at proper intervals apart, according to the dimensions of the intended wheel; and they then subject the said parallel swells to compression in moulds or dies, by means of hydraulic or other power, and thus reduce them to a double-wedge shape, the two wedge-shapes being united at their apices. The dies, or moulds should be accurately formed, and the bar thus produced cut into lengths at the junction line of the wedged-shaped pieces; each length is then bent into the proper triangular form, and eight of such triangular segments placed together to form a perfect wheel, the joints at the nave requiring no further fitting previous to welding.

The claims are for the improvements stated above as constituting the invention.

WILLIAM NAIRNE, of South Inch Mill, Perth, Perthshire, flax-spinner. *Improvements in power-looms.* Patent dated January 17, 1853. (No. 113.)

The objects of these improvements are, to remove all extra strain from the warp; to render the loom so certain in its action that the cloth shall be produced of the same thickness from beginning to end of the web without any alteration of the machinery, and to ensure the condition that all *gaus* or small portions without weft shall be

avoided. These are effected by driving the yarn or warp-beam with a train of wheels put in motion by a circular plate or disc revolving on a shaft, against the face of which disc the first wheel of the above-mentioned train, which is a friction-wheel, is pressed by a weight or spring. The friction-wheel recedes from the centre of the disc as the diameter of the yarn on the warp-beam is diminished, whereby the revolving motion of the beam is increased, so that the surface of the yarn upon it always moves with the same speed. The different sets of webs are regulated by change pinions in the train of gearing.

To regulate the uptake of the cloth-beam, a rocking shaft is placed in the framing of the loom between the breast-beam and the cloth-beam. Upon this shaft two arms are fixed, in which a roller revolves as the cloth passes over it. Another roller is placed nearly on a level with the rocking-shaft, and two or three inches in front of it. The cloth therefore in coming from the under side of the breast-beam over the roller fixed in the arms of the rocking-shaft, and also over that in the front of the shaft may be said to have its parts lying in directions which form an isosceles triangle, of which the angles towards the breast-beam and the front roller are equal. There is also a weight, which by descending as the warp unwinds, brings two friction-wheels into contact, and so gives motion to the cloth-beam, and thereby regulates the tension of the web.

Claim.—The application of the plate differential motion to regulate the motion of the yarn-beam, and the invention and application of the machinery described for regulating the tension of the web, and the motion of the cloth-beam.

Auguste Edouard Loradoux Bellford, of Holborn, London. *Improvements in the manufacture of batting or wadding.* (A communication.) Patent dated January 17, 1853. (No. 114.)

Claims.—1. The making of batting or wadding, for all purposes, by covering both sides of layers or sheets of cotton, or other fibrous material that have been merely well picked, cleaned and spread, with layers of the same or any other fibrous material which has been carded and rendered compact.

2. The manner of arranging and combining machinery for making batting or wadding, consisting of one or more carding-engines at each end of the train, with lapping and cleaning machinery between, as described.

3. The uniting of two or more layers of cotton batting together, by means of any glazing material, thereby producing the new article of manufacture termed "cotton felt" by the inventors.

4. An apparatus described, constructed for the purposes of ironing and glazing the bats, compressing them together, and drying the fabric formed by their junction in one operation.

Auguste Edouard Loradoux Bellford, of Holborn, London. *Improvements in the manufacture of blocks for printing music.* (A communication.) Patent dated January 17, 1853. (No. 115.)

This invention consists in a method of manufacturing blocks for printing music with a typographical press, in which the staves are entirely omitted in the composition of the notes, and are afterwards introduced.

John Thornborrow Manifold, and Charles Spencer Lowndes, of Liverpool, engineers. *Improvements in steam-engines.* Patent dated January 18, 1853. (No. 120.)

The improvements relate to engines in which the steam is used expansively after leaving the high-pressure cylinder, and are shown as applied to a marine oscillating engine. In its general features this is constructed in the usual way, the high and low pressure cylinders being set at an angle to each other on opposite sides of the main crank-shaft, with their piston-rods acting upon a single crank-pin with the same effective operation as in a common double engine with the cranks at right angles. The steam first acts on the piston of the high-pressure cylinder, and is then conducted into the low-pressure cylinder, the piston of which it actuates by its expansive power, so that the arrangement is in fact equivalent to a high and low pressure-engine combined.

Claims.—1. The general arrangement of steam engines.

2. The system of combining a single high-pressure engine with a single low-pressure engine on the Woolf principle, so that the two may actuate a single crank, each engine giving out the same, or nearly the same amount of power to secure uniformity of motion and strain.

3. The system of constructing an oscillating double cylinder expansion Woolf's engine, with the axes of the cylinders at an angle with each other, and both pistons working on one and the same crank.

Henry Browning, of Bristol, Somerset, painter. *Improvements in preparing compositions for coating iron and other ship's bottoms and other surfaces.* Patent dated January 18, 1853. (No. 121.)

The patentee prepares his compositions from white and red lead, without oil, black lead and sugar of lead mixed with a solution

of gum copal in spirits of turpentine (white copal varnish). The proportions of each of the three first ingredients are as four to one of the latter; and the quantity of varnish will vary with the consistence required to be given to the composition. The sugar of lead is reduced in quantity, or omitted for the second and subsequent coatings.

The claim is for the combination of materials described, without limit as to proportions.

ORLANDO REEVES, of the Castle, Taunton, Somerset. *Improvements in the manufacture of manure.* Patent dated January 18, 1853. (No. 123.)

Mr. Reeves compounds his manures from vegetable substances, or charcoal, alone or mixed with an alkaline or earthy salt, combined with chemical materials capable of absorbing and fixing the ammonia disengaged from gas, or from the refuse lime from gas purifiers, mixed with certain chemical, animal, and mineral substances.

ALFRED VINCENT NEWTON, of Chancery-lane, Middlesex. *An improved sewing machine.* (A communication.) Patent dated January 18, 1853. (No. 124.)

This invention consists in an arrangement of machinery wherein a bearded needle is employed for throwing a line of looped stitches into the fabric that is required to be stitched. This fabric is hung upon pins projecting from two circular racks which move in grooves formed in the face of a circular frame. These racks are driven by pinions taking into their teeth, and the fabric is thereby passed under the action of the needle, which, having a quick reciprocating motion, similar to that of the needles of stocking-frames, and being in like manner supplied with thread, is passed backward and forward through the fabric, leaving a chain of loops on the inner face of it. A stiletto, carried by the same arm, pierces the holes for the needle to pass through.

Claims.—1. The general arrangement of parts as set forth.

2. The use of a bearded needle, pressing-plate, and thread-carrier in combination.

PETER FAIRBAIRN, of Leeds, York, machinist, and SAMUEL RENNY MATHERS, of Leeds, York, flax-spinner. *Certain improvements in machinery for drawing the sliver and rove of flax, hemp, and tow.* Patent dated January 18, 1853. (No. 125.)

This invention relates to the two following contrivances:

1. A novel mode of mounting the pressing-rollers of flax-spinning frames, in which the upper and lower pressing rollers are provided with separate carriers, which are severally suspended from a common axle, and are each provided with an independent weighted lever.

2. A mode of adjusting the "reach" of the retaining rollers simultaneously, without removing them from the machine, in which is employed a series of brackets that carry the back retaining-rollers, and that are capable of sliding up and down in guides formed in the stand, for the purpose of raising or lowering the retaining-rollers, and thereby altering the reach. Through each bracket is passed a screw-shaft, turning in bearings provided for it in the stand, and carrying a worm-wheel which takes into and is driven by a worm on a horizontal shaft extending from end to end of the machine. By turning the shaft, a motion is communicated through the worm and worm-wheel, and thus all the brackets are raised or lowered as required, bearing with them the rollers, the elevation of which is determined to suit the various lengths of fibre under operation.

Claims.—1. Supporting the retaining and the drawing pressing-rollers on independent lever-carriers, as described.

2. Raising and lowering the back retaining-rollers simultaneously, by the means described.

JOHN SHERINGHAM, of Kensington, Middlesex, gentleman. *Certain improvements in stoves and grates.* Patent dated January 18, 1853. (No. 127.)

This invention consists in certain mechanical arrangements, among which is a blower so fitted that its position in front of the fire can be altered so as to cause an increase or a reduction of the draught of the chimney, and which can also be lowered so as to form a screen before the ashes under the grate, and so raised as to form a protection against accidental fire from the projection of burning coals into the room. To this blower may be added a screen, which the inventor calls a "curfew;" or this may be connected to the grate as a door, or as folding-doors with apertures in either of such screens for the supply of air. By either of these additional screens, with the blower, the whole of the fireplace may be so closed in front as to form a close stove, by which means the fire may be gradually extinguished, or a slow combustion of the fuel may be sustained. The appliances are worked by means of chains passing over sheaves, and carrying counterbalancing weights, &c.

Claim.—The use and application of a blower and of a removeable screen or curfew, either separately or combined, and actuated in the manner described.

ROBERT NEALE, of Cumming-street, Pentonville, engraver, &c. *Improvements in the process of copper and other plate and*

cylinder printing and inking, and wiping and polishing by machinery the engraved plates and cylinder, whilst used in the process. Patent dated January 18, 1853. (No. 128.)

In the arrangement described by Mr. Neale for plate printing, the engraved plate is carried by an endless revolving belt or chain, and supported on an iron plate or bed attached to the chain and made hollow to receive a heater for keeping the plate warm. The press is provided with a frisket, on which the paper is placed previous to being printed, and with blankets in connection therewith to receive the pressure, which is given by a roller revolving in bearings above the travelling chain; the blankets and frisket passing under this roller at the same time as the bed carrying the engraved plate. The ink-troughs are placed underneath the revolving-belt, and the ink is transferred from them to the plate by means of rollers, the upper of which are elevated against the plate as each revolution of the endless belt brings it over them. Between the inking-rollers and the engraved plate are introduced moveable stencil plates, having designs corresponding to those of the plate, and by the combined operation of the stencils and upper inking-rollers a variety of colours may be printed from the same plate at the same time. The first wiping of the plate, by which the greater portion of the ink is removed, is effected by means of a revolving band, in contact with which the plate has to pass before it reaches the pressure-roller; and the wiper itself is cleaned from the adhering ink by means of a scraper and belt of cotton sheeting. The plate is further cleaned and polished before giving an impression, by means of revolving wipers and polishers, the pressure of which against it can be regulated to any degree of nicety; and the ink removed by these latter is cleaned from them before they again come into action, by means of a belt of cotton sheeting, as in the case of the endless wiper before-mentioned. The same general principle of construction may be adopted when printing from cylinders, or from engraved plates bent to the circular form and attached to the peripheries of cylinders.

Claim.—Combining apparatus herein explained for inking, wiping, and polishing engraved plates and cylinders used in copper and other plate and cylinder printing.

COMPLETE SPECIFICATIONS FILED WITH APPLICATIONS.

John Jaques the younger, of Hatton-garden, Middlesex, manufacturer. *Improvements in the manufacture of chess-boards and chess-men.* Patent dated July 2, 1853 (No. 1589.)

The objects of this invention are to secure the pieces in any positions in which they may be left, and to reduce their height so as to make the board when closed more portable. The method of securing the pieces consists in the application of two thin plates inserted at the half thickness of the board with pear-shaped holes in them, of which there is one in every square; and these are capable of being moved by a spring, so as to lock the men in their positions whenever the players please.

Abraham Walker Craig, Daniel Foster, and Thomas Valentine, of Belfast, Antrim, Ireland, flax-spinners. *Improvements in preparing for weaving wet-spun yarns of flax and tow.* Patent dated July 13, 1853. (No. 1662.)

These improvements consist in drying yarn spun wet from flax or tow, while upon the spinning-bobbin (that is, the bobbin upon which it has been spun), instead of drying it in the hank as customary; by which mode of proceeding the process of reeling into hanks is avoided. The patentees take the bobbins as soon as they are removed from the spinning-frame, and place them in open boxes with perforated bottoms, in which they subject them to heat or to currents of heated air, so as to dry the yarns on them quickly. The bobbins, if of the ordinary kind, are liable to split or twist during their exposure to heat; but when made from mahogany, without bushes, they are not subject to this contingency.

Claim.—The drying of wet-spun yarns of flax and tow whilst on the bobbins upon which they have been wound by the process of spinning, whereby the process of reeling into hanks for drying is rendered unnecessary.

Patrick O'Malley, of Dublin, brewer, *A new liquid beverage.* Patent dated July 15, 1853. (No. 1684.)

Were it not that our abstracts of specifications already extend over so many pages of our Magazine, we should like to indulge the curiosity of our readers by giving them Mr. O'Malley's at length, as it is unquestionably a remarkable one. We must content ourselves, however, with the following abstract:—To make 600 *gallons* of this new *liquid* beverage, *from* 900 *to* 1,000 *gallons* of water are mixed with prescribed quantities of certain substances, which are, or rather the larger portion of which are, these; buckbean, mountain sage, dandelion, gentian, watercress, garden-cress, honey, salt, sugar, oats, buckwheat, carraway-seeds, cowslip flowers, saffron, hens' eggs (with their shells, which are first dissolved by vinegar), wild berries (such as are known

as *herbs* in "County *Tipperary*,") or garden apples, or raisins, and common heath, or heather (such as Mr. Patrick O'Malley has "found in large quantities on the Wicklow mountains.") The whole is then *boiled* for a space of two hours and a half "at about boiling heat, *or something under it*," and subsequently treated as in the ordinary processes of brewing.

Such is the character of Mr. O'Malley's invention, and his claim is this:—The extracting of a liquid beverage possessing useful and beneficial qualities from the materials before-mentioned, *or from some of them*, or *from similar materials*, by subjecting them to the action of boiling water, &c., &c.

PROVISIONAL PROTECTIONS.

Dated March 30, 1853.

761. Louis Michel Lombard, of Paris, France, barrister-at-law. Improvements in obtaining motive power.

Dated June 18, 1853.

1491. John Moore Hyde, of Bristol, philosophical-instrument maker. Improvements in steam engines, and the production of steam for the same.

Dated June 21, 1853.

1519. Juste Giret, of Rue Papillon, Paris, France, gentleman. Certain improvements in artificial and malleable stones, and in the apparatus to be used for such purposes.

1520. John Leach, of Over Darwen, Lancaster, overlooker. Improvements in looms for weaving.

Dated June 28, 1853.

1559. Carlo Minasi, of Camden Town, Middlesex, professor of music. Improvements in concertinas.

1561. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, London. Improvements in steam boilers. A communication.

1563. John Henry Johnson, of Lincoln's-inn-fields, Middlesex. Improvements in turning over the leaves of books, music, and engravings, and in the apparatus for effecting the same. A communication from Claude Desbeaux, of Paris, France.

Dated June 29, 1853.

1565. Frederick Steiner, of Hyndburn, near Accrington, Lancaster, Turkey-red dyer. Improvements in the manufacture of wooden rollers or cylinders.

1567. John Patterson, of Beverley, York, engineer. Improvements in machines for reaping and mowing corn, grass, and other crops.

1571. Pierre Amable de Saint Simon Sicard, of Paris, chemist. Improvements in apparatus for facilitating the raising, moving, and breaking up of sunken vessels and other submerged substances.

1573. Lemuel Wellman Wright, of Chalford, Gloucester, engineer. Improvements in the permanent way of railways.

Dated June 30, 1853.

1574. Elias Robison Handcock, of Pall-mall, Westminster. Certain improvements in mechanism to decrease friction in propelling-machinery, and to compensate for the wear thereof, and to strengthen the driving parts.

1575. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn. Improvements in the construction of submarine or subaqueous tunnels or ways. A communication.

1576. William Rice, of Boston, Lincoln, miller and corn-merchant. Improvements in harness for horses and other animals, and in the manufacture of springs for the same.

1577. Joseph Webb, of Mayfield-terrace, Dalston, Middlesex. Improvements in obtaining and applying motive power.

1578. George Sterry, of Worcester, carver and gilder. An improved method of producing designs and patterns in wood.

1579. Andrew Peddie How, of Mark-lane, London, engineer. An engine-meter or instrument for indicating the number of strokes of an engine. A communication.

1580. Edward Davies, of Gothenburg, Sweden, manufacturer. Improvements in machinery or apparatus for carding and otherwise preparing cotton or other fibrous materials to be spun, and also for cleaning or striping cards used in the said operations.

1581. William Charles Spooner, of Eling-house, near Southampton, Hants, manufacturer of chemical manures. Improvements in drills for agricultural purposes.

1582. William Tasker, of the firm of Tasker and Fowle, of the Waterloo Works, near Andover, Hants. Improvements in drills for agricultural purposes.

Dated July 1, 1853.

1583. Richard Bradley and William Craven, of Westgate-common Foundry, Wakefield, York, engineers and ironfounders. Improvements in the moulding, forming, and compressing of clay for the manufacture of bricks, tiles, and other earthenware.

1584. Philip Hart, of Brierly-hill, Stafford, agent. Improvements in the manufacture of coke.

1586. George Parsons, of West Lambrook, Somerset, agricultural-implement maker. Improved machinery for threshing, winnowing, and dressing corn, grain, and seeds.

1587. Edward Clarence Shepard, of Trafalgar-square, Middlesex, gentleman. Improvements in magneto-electric apparatus suitable for the production of motive power, of heat, and of light. A communication.

Dated July 2, 1853.

1588. John Rollinson, of Kingswinford, Stafford, engineer, and William Rollinson, of Brierly-hill, Stafford, engineer. A new or improved apparatus for preventing explosions in steam boilers.

1590. Lemuel Wellman Wright, of Chalford, Gloucester, engineer. Improvements in machinery or apparatuses for reducing and pulverizing gold and other metalliferous quartz and earths, and in separating metal therefrom.

1591. Edward Clarence Shepard, of Trafalgar-square, Middlesex, gentleman. Improvements in the manufacture of gas. A communication.

1592. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agents. Certain machinery for converting caoutchouc into circular blocks or cylinders, and for manufacturing the same into sheets. A communication from François Peroncel, of Paris.

1593. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agents. Improvements in impregnating, saturating, or coating threads, yarns, and fabrics with metal, which process the inventor terms metallic dyeing. A communication from Charles Depoully, of Paris.

Dated July 4, 1853.

1595. Gabriel Didier Fevre, of Paris, France. An improved vessel to be used for the purposes of

infusion and decoction, heating liquids, and melting glutinous substances.

1597. George Frederick Parratt, of Piccadilly, Middlesex. Improvements in portable bridges, rafts, or pontoons.

Dated July 5, 1853.

1598. Henry Meyer, of Manchester, Lancaster, engineer. Certain improvements in looms for weaving.

1599. Marcus Davis, of Gray's-inn-lane, Middlesex, silent carriage maker. Improvements in carriages, scaffoldings, and ladders, which scaffoldings and ladders are used as carriages.

1600. Decimus Julius Tripe, of the Commercial-road East, Middlesex, student in medicine. Improvements in locks.

1601. John Fall, of Chorlton-upon-Medlock, Manchester, gentleman. Improvements in the treatment of certain oils.

1602. Nathan Pollard, overlooker, of Bowling, near Bradford, York. An improvement in machinery for drawing wool and other staple.

1603. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. Improved machinery for printing. A communication.

1604. George Mackay, of Buckingham-street, Strand, gentleman. Improvements in the manufacture of glass. A communication.

1605. Moses Poole, of Avenue-road, Regent's-park, Middlesex. An improved quartz-crushing, pulverizing, and amalgamating-machine. A communication.

1606. George Arthur Biddell, of Ipswich, engineer. Improvements in apparatus for crushing grain, seeds, or pulse.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," July 15th,* 1853.)

478. John Palmer de la Fons. Improvements in applying skids or drags to omnibuses.

(*From the "London Gazette," July 19th,* 1853.)

378. Charles Hadley. Improvements in the means of communicating between the passengers, guard, and driver of a railway train, parts of which improvements are applicable to communicating on vessels.

384. Jean Antoine Gervais. Certain improvements in treating fermentable liquids, and in the machinery or apparatus employed therein.

444. Ezra Miles. Improvements in railway-brakes.

452. George Wipiwarter. Improvements in the manufacture of fire-arms.

454. Samuel Beckett. An improvement or improvements in mule spindles, and spindles of a similar description for spinning or twisting various fibrous substances, and in the mode of manufacturing and producing the same

465. Henry Walmsley and Thomas Critchley. Improvements in machinery or apparatus for retarding or stopping railway trains, which machinery or apparatus is also applicable as a signal or communication from one part of a train to the other.

480. Henry Martyn Nicholls. Improvements in emission or reaction engines.

482. John George Taylor. Improvements in ornamental fastenings for dress.

516. Laurence Hill, junior. Improvements in the production of motive power. A communication.

545. Robert Craib Ross. An improved machine or instrument for cutting files and forging metals.

591. John James Alexander Maccarthy. Improvements in gunnery and projectiles (with pouch for the latter), which are adapted for muskets, rifles, pistols, and heavy cannon, for field-pieces, for forts, batteries, ships of war, and other vessels.

624. Auguste Edouard Loradoux Bellford. Improvements in machinery for cutting standing crops, and gathering the same into sheaves or bundles. A communication.

648. Ephraim Sabel. Improvements in the construction of looking-glasses, and in the apparatus connected therewith. A communication.

653. Henry Richardson Fanshawe. Improvements in fire-arms.

761. Louis Michel Lombard. Improvements in obtaining motive power.

926. George Albemarle Cator. Improvements in machinery for preparing flax, hemp, and other vegetable fibrous substances, for scutching or other manufacturing processes.

956. Richard Archibald Brooman. Improvements in reaping and gathering-machinery. A communication.

1186. Richard Archibald Brooman. Improvements in the manufacture of hats. A communication.

1236. Edward Briggs. Improvements in the manufacture of pile fabrics, and in the machinery or apparatus employed therein.

1273. John Henry Johnson. Improvements in the construction of pipe and other junctions. A communication.

1309. William Wolfe Bonney. Improvements in machinery for raising a pile or flue by abrasion on linen, cotton, silk, and other fabrics.

1360. William Edward Newton. Improvements in the manufacture of soles for boots, shoes, and other coverings for the feet. A communication.

1362. Jean Durandeau, junior. Certain means of obtaining marks and designs in paper.

1472. Joseph Warren. Improvements in ploughs.

1532. Joseph Aspinall. A self-adjusting stamp.

1545. Henry Goodall. Improved machinery or apparatus for grinding or levigating various substances.

1556. Alfred Vincent Newton. Improved apparatus for manufacturing rosin oil. A communication.

1557. George French. Improvements in axles or axletrees.

1559. Carlo Minasi. Improvements in concertinas.

1562. Auguste Edouard Loradoux Bellford. Improvements in magneto-electric machines. A communication.

1563. John Henry Johnson. Improvements in turning over the leaves of books, music, and engravings, and in the apparatus for effecting the same. A communication.

1567. John Paterson. Improvements in machines for reaping and mowing corn, grass, and other crops.

1579. Andrew Peddie How. An engine-meter or instrument for indicating the number of strokes of an engine. A communication.

1587. Edward Clarence Shepard. Improvements in magneto-electric apparatus suitable for the production of motive power, of heat, and of light. A communication.

1591. Edward Clarence Shepard. Improvements in the manufacture of gas. A communication.

1593. Richard Archibald Brooman. Improvements in impregnating, saturating, or coating threads, yarns, and fabrics with metal, which process the inventor calls "metallic dyeing." A communication.

1601. John Fall. Improvements in the treatment of certain oils.

1602. Nathan Pollard. An improvement in machinery for drawing wool and other staple.

1604. George Mackay. Improvements in the manufacture of glass. A communication.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed July 15, 1853.

1853:

105. Edward Tasker.
107. James Hadden Young.
113. William Nairne.
114. Auguste Edouard Loradoux Bellford.
115. Auguste Loradoux Bellford.
128. Robert Neale.
136. Joseph Maudslay.
225. William Archer.
639. John Scott, junior.
713. John Beaumont.
734. John George Truscott Campbell.
738. John Scott, jun., and George William Jaffrey.
983. William Johnson.
1102. Charles Larbaud.
1121. Christopher Nickels.
1154. Samuel Russell.
1195. Moses Poole.
1199. John O'Keefe.
1204. Robert Walter Swinburne.
1216. Joseph Webb.
1232. William Gossage.
1238. Thomas Grahame.
1253. Edward Hammond Bentall.
1257. Joseph Betteley.
1268. Amédée Devy.
1272. John Henry Johnson.

Sealed July 16, 1853.

110. Thomas Potts and James Septimus Cockings.

Sealed July 18, 1853.

124. Alfred Vincent Newton.

Sealed July 19, 1853.

239. William Constable.
397. Joseph and Alfred Ridsdale.
582. Nicolas Schmitt.
809. William Willcocks Sleigh.
1140. Thomas Quaife.
1225. Richard Thompson.
1283. Louis Auguste Devert.
1285. William Edward Newton.
1287. William Haslett Mitchel.

Sealed July 20, 1853.

140. Cornelius Ward.
141. Cornelius Ward.
148. George Carter.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1564.] SATURDAY, JULY 30, 1853. [Price 3d. Stamped 4d

Edited by R. A. Brooman, 166, Fleet-street.

HORTON AND WYLDE'S PATENT STEAM-GENERATORS.

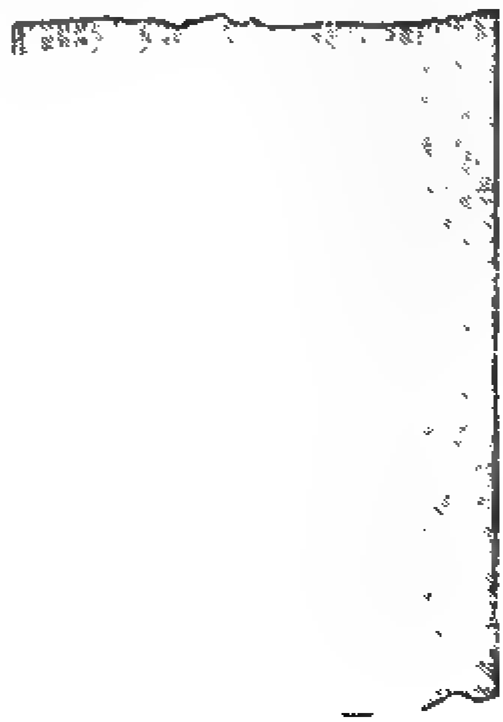


Fig. 2.

Fig. 1.

HORTON AND WYLDE'S PATENT STEAM-GENERATORS.

(Patent dated April 15, 1852.)

THE steam-generators represented in the accompanying engravings are modifications in some few particulars of the arrangement described in the enrolled specification of Messrs. Horton and Wylde's patent of April, 1852; the difference, it will be seen, being merely in matter of detail, not at all affecting the general plan; the second of these is considered to be the more economical, and is undoubtedly more simple in its construction than the first. In both these arrangements the prominent and novel feature is the application of steam generated in an inner vessel to vaporize water in an outer one; heating surfaces, consisting partly of tubes, being in each vessel the mode in which the heat is applied. From this arrangement a great advantage is derived as regards the safety of the boiler, and a very much smaller degree of attention is called for on the part of the engineer; as a constant succession of vaporisation, condensation, and re-vaporisation is going on between the fluid contents of the two vessels. The manner in which this result is obtained will be made clear upon reference to the accompanying figures, which exhibit the construction of both sorts of generators.

Fig. 1 is a longitudinal section, and fig. 2 a transverse section of one boiler on this principle. A A is the outer shell, and B B the inner shell, or generator. E E are two longitudinal tubes, containing the fire to be used for generating the steam, which is afterwards applied for evaporating the water in the outer shell, A A. C is a combustion-chamber, in which the gases mix, and in which, by the admission of a suitable quantity of atmospheric air, the smoke evolved from the fuel is partially consumed. The flame and heated air pass through a number of iron tubes, D, back under the bottom of the shell, and return on each side to the stack. A cylindrical tube, L, is fixed over the boiler, of a capacity sufficient to contain the dry steam for the purpose required. F F are steam-chambers, connected by another system of tubes, G, previously fitted and placed loosely upon the inner shell, B. These steam-boxes are connected with the generator, B, by tapped screw-pipes, H H.

The steam, as it is generated by the fire within the generator, B, rises into the chambers, F F, through the pipes, H H, circulating through and filling the tubes, G, which, as well as the shell, B, are covered with water. The heat thus imparted to the water in A A evaporates it, and the steam generated is led out to supply the engine, or for other purposes. In addition to the tubes in the outer vessel, A A, the upper part of the inner shell, B, presents its surface for the same evaporative purpose. The steam generated in the vessel, B, after imparting its heat through the shell, B, the chambers, F F, and the tubes in A A, to the water surrounding these surfaces, and becoming thereby condensed is changed into water and falls back into the generator, B, where it is worked over, rises again as steam, and returns as it is condensed into the same vessel. Thus the vessel containing the fire, which usually requires the strictest attention of the engineer to regulate the feed, and prevent the water getting too low—the danger of which is obvious—is by this arrangement rendered much more safe and less liable to accident from explosion. The feed also becomes almost self-acting, as the same purified water may be used for weeks together, the vessel, B, being tight, and the fire regulated to prevent waste at the safety-valve. A safe level of water may be thus always maintained without the usual necessary watching and attention; although it would still be desirable to use water-gauges, cocks, valves, and all modern improvements to ensure safety. The steam-chamber and tubes F F, in the upper vessel, acted upon by the intense heat of steam only instead of fire, are free from any liability to accident, as, should the surface of those tubes become dry from neglect, or otherwise, no explosive gases are generated. The inner shell, B, which is slightly oval, and therefore, at first sight, might appear to have a weak shape, is in this instance of no consequence, as it is strongly riveted to the outer shell at I I, and a further connection is made by plates to collect the deposit from the water at K K, to which mud-cocks are attached. There is at all times also an excess of pressure in the inner shell necessary for the economical effect produced, and tending to force it into a more circular and stronger shape, besides being properly secured by stays. One circular shell within another can be used for very high pressure, if preferred; but this form is considered sufficient for all ordinary purposes for either low or high pressure.

The tubes here used are of the best iron and workmanship, and are firmly fixed, in a manner protected by Whitehouse's patent, which affords, in addition to the large heating-

surface in a small compass, great strength to the boiler. This method of fixing also subjects them to much less wear and tear, and provides for their removal, when necessary, in a safer and more expeditious manner than any now in use. As a proof of their quality, the patentees require such tubes to resist the pressure within them, as well as without, as will be seen by the application of them in the steam-boxes, F F. Without cutting or destroying the tubes, even when incrusted, provision is made for examining and cleaning every part of the boilers, and the whole system, including the fire-tubes, chamber, &c., can be removed by cutting off a few rivets at one end. The boiler can also be set up without brickwork, a sufficient quantity of heating surface being provided in the flues, chambers, and tubes, to dispense with the necessity for it.

Fig. 3 is a longitudinal section of another description of boiler, of a more simple and less costly construction, of which it will only be necessary to describe the parts differing materially from the boiler just noticed.

Fig. 3.

The fire-grate is here fixed underneath the outer shell, but acts upon and imparts its heat to the inner vessel, B. The heated air and products of combustion pass from the fire into a chamber formed by the extension of the upper shell, A A, built up at the back with brickwork, at C, and from thence, through a number of tubes through the boiler, into another recess, formed also by a projection of the upper shell, returning in brick flues on the sides of the outer shell, after imparting all available heat to the water in the two vessels. D is a hinge carrying an iron door, which directs the draught along the sides, and by the opening of which facilities for brushing out the tubes when requisite are afforded.

Boilers of this construction occupy little space; the more than ordinary heating sur-

face, and the great strength being obtained by the tubes, and the manner of fixing them. Although the receptacle for the sedimentary deposits is here immediately over the fire-grate, the usual objection is now done away with; as the same water being returned over and over again without the introduction of feed, the sediment is in a short time removed by the mud-cocks, the water becomes perfectly pure and smooth, and clear surfaces are maintained in the boiler, insuring the absorption of the full effect of the fire, without incrustation and consequent damage to the plates. A further advantage in the improved tubular boiler is, that the fire underneath the shell may be used without fear of injury to the plates, and the grate can be used to burn the most inferior slack or dross.

We understand that Messrs. Horton and Wylde are at present engaged in perfecting some improvements in marine steam-boilers upon the same principle, by which they hope to diminish very largely the quantity of fuel consumed, to increase the safety of the vessel, and at the same time to make the boiler yield a larger vaporising power.

DENISON'S THREE-LEGGED GRAVITY ESCAPEMENT.

A gravity clock-escapement, of the "three-legged" form, possessing the property of being independent of the friction of the wheel-train, is described with great minuteness of detail by Mr. Edmund Beckett Denison, M.A., in the *Cambridge Philosophical Transactions;* and the same paper contains a *resumé* of the present state of this branch of the science of horology, together with an account of the several objects which have recently been attempted in it. From a full consideration of all these, the author has come to the conclusion that it is hopeless to expect any farther material improvements in clock escapements—in any direction—except that of reducing, if not of removing altogether, the friction which affects the pendulum. This, he shows, has been the great problem for many years past—the invention of a simple gravity escapement, which, giving a constant impulse to the pendulum, shall have no friction capable of affecting the arc of vibration. Supposing this object to be accomplished, mechanical disturbances of the time of one vibration will be removed, and all that will then remain to be done will be to cause the escapement to exert a uniform action on the pendulum, notwithstanding variations in the density of the air and other accidental causes. Graham's *dead-escapement*, and a modification of it known as the *pin-wheel escapement*, have come into very general use for astronomical and turret clocks, but Mr. Denison considers that their success has arisen from a fortunate balance of errors due to inconstancy of impulse and variations in friction; and that they do not fulfil the great condition sought after. "Mr. Airy has shown," he observes, "in a paper on the disturbances of pendulums, in vol. iii. of the *Cambridge Transactions*," that it was owing to this cause that the difference between the time of a free pendulum, and of the same pendulum under the influence of these escapements, is less than the difference produced by any other escapement." Mr. Airy inferred from this that the variation of this difference from day to day, must be less under these circumstances than with any other escapement; but the author has shown that this variation might be made to vanish altogether in a *gravity* or *remontoir* escapement, by a construction which makes the difference of time from that of a free pendulum a maximum. These self-acting corrections he regards as being extremely unsatisfactory, approximating only to the truth, and depending very much on the excellence of the workmanship, which tends to increase the cost of the clock, frequently making it amount to from £30 to £80, according to the degree of finish, though containing little machinery, and that not of a complex kind.

Speaking of one of these errors, called the *circular error*, which is partially and uncertainly corrected by the pendulum-spring, the author says that when a decrease of arc arises chiefly from an increase of friction on the pallets, the clock will generally lose in spite of the circular error; but where it chiefly arises from an increase of friction in the train, the clock will gain. Upon consideration of these errors, he has come to the conclusion that all such contrivances as "cycloidal checks, springs for accelerating the pendulum as the arc increases, and all other 'isochronous' contrivances, are practically useless, and in many cases are even more likely to aggravate the actual error of the clock than to correct it." To this remark he makes one exception in favour of turret clocks, where the variations of friction are much greater than in regulators, and it is found beneficial to give a slight recoil to the dead part of the pallets. The addition of a remontoir to a turret-clock train, just below the scape-wheel, he considers very valuable for equalling its force. A spring remontoir, described by

him in a former paper, had been used in one of two of Mr. Dent's clocks in the same town, similar to each other in all other respects, and placed under the care of the same clock-maker; who reported, however, that he found it impossible to keep the one without the remontoir at so good a rate as the other.

Of the latest attempts to improve the escapement by removing the friction which affects the pendulum, the author notices a few which appear to be the most promising. Bloxam's escapement, where he found that the scape-wheel lifts the gravity-arms, or pallets, through a very small angle, and therefore slowly, and without giving them such a velocity as to enable the tooth of the scape-wheel to slip, instead of being caught and stopped (which is called *tripping*), he at first thought answered all the conditions of a gravity-escapement. Upon examination, however, he found that the fulfilment of the mathematical conditions would lead to most serious mechanical difficulties. If the lift were increased to render the escapement independent of any moderate change of arc, it would still be liable to trip; and though, consequently, he believed it would go better than any dead escapement, he could not regard it as a perfect gravity-escapement. There were several new gravity-escapements in the Exhibition, but none of these he considers likely to get into common use. Macdowall's *single-pin* escapement, so called because the scape-wheel is only a small disc with a single pin in it, of ruby, parallel and near to the arbor of the disc, possesses, in his opinion, advantages in some respects over Graham's or any other escapement of its class. The disc turns half round at every beat of the pendulum, and the pin gives the impulse on the vertical faces of the pallets; the dead friction taking place on the horizontal faces, as other dead-escapements. The advantage of this arrangement is, that the greatest part of the impulse is nearly direct, and is therefore given with hardly any friction; and the author says he knows a watch of this kind which has been going very well for above a year, and which was exposed on some of the cold nights of last winter when a watch with a common lever-escapement would have been stopped. Two additional wheels, however, are introduced into the train by this means, and the last pivot has to turn with a velocity such that the force on the disc would be liable to vary a good deal from variations in the state of the oil. This last objection led the author to the three-legged dead-escapement, which, besides removing it, would also enable the direct or middle portion of the impulse to be retained. The impulse is given on the vertical faces of the pallets, as the tooth in action passes through its highest or lowest arc of 60°, with scarcely any friction. To exhibit the advantage of this arrangement, he mentions the fact that the pendulum of the Westminster clock, in order to have its length adjusted, had been previously set going with a common church-clock movement and pin-wheel escapement, and then required a weight of 80 lbs. to make it swing through the usual arc: but with the three-legged escapement it was necessary to take off all the weight except 15 lbs.; so that at least four-fifths of the duty of the scape-wheel must be wasted in first producing and then overcoming the friction of the common dead-escapement.

Mr. Denison states at some length the conditions which an escapement ought to satisfy, and these he reduces to five. The first is that it must be safe from tripping, or from any risk of the pallets by which the scape-wheel teeth are stopped being thrown so far in lifting, that the tooth misses the stop altogether. Where this condition is not observed at least two beats of the pendulum are missed, and then the scape-wheel acquires such a velocity that several of the teeth may be bent by striking against the stops, and then the tripping action goes on worse than before. Cumming, the first inventor of any contrivance for obviating this difficulty, employed two pairs of arms, one of which was only used for locking, and was not lifted by the scape-wheel at all, but only by the pendulum in unlocking it. This arrangement was to some extent effectual, but the points of the teeth having gradually become bent by their continual impact against the stops without anything to moderate the velocity, tripping was at length the consequence in one instance, where it was stated to work better than an expensive dead-escapement lock. In Hardy's escapement the four arms were put upon springs, to avoid the friction of so many pivots. These springs, however, being stiffer in cold than in hot weather, and acting upon the pendulum at the extremity of its arc, made the clock gain in winter. Captain Kater proposed to get rid of tripping by making the impulse-arms drop on an anchor and so unlock the scape-wheel by their weight acting alternately on the different sides of the anchor. Mr. Gowland's patent escapement has paddles on the pallets, which descended into a pot of oil to resist their motion. This appeared to answer well, though not a very elegant expedient. M. Gannery's escapement resembled Mr. Gowland's, but it dispensed with the pot of oil by giving to the scape-wheel a large motion for a small one of the arms, as in Bloxam's. The second condition is that the escapement should be secure against what the author terms *ap-*

proximate tripping, and which he thinks clock-makers have left unnoticed altogether. In this case the depth of the locking has sufficed to prevent actual tripping, with any probable amount of force on the scape-wheel, but the arc has sensibly increased when the clock-weight was increased. In the third place, the escapement should have no friction sufficient to require oil on any of the parts affecting the pendulum.

The fourth is a mathematical condition which the author investigated in a former paper, and which is expressed as follows: —If W be the clock-weight, or rather so much of it as arrives at the pendulum clear of friction, h its daily fall, and M and l the weight and length of the pendulum, then the daily rate will be

$$-\frac{Wh}{Ml\pi a^2}\cdot\frac{\frac{a^2}{\gamma^2}-2}{\sqrt{\frac{a^2}{\gamma^2}-1}}\frac{da}{a}$$

in which γ is the arc of the pendulum from zero, where the pendulum takes up one arm just as it leaves the other, and a the extreme arc. It is found that γ ought to be

$$\frac{a}{\sqrt{2}},$$

or ·71 a nearly, to make the difference of time from that of a free pendulum a maximum. The error, however, will be still insignificant if γ deviate from the value so far as $\frac{a}{2}$. In the Westminster clock Wh is certainly not above 10 lbs. × 6 feet, and Ml is 660 lbs. × 13 feet. Consequently, taking

$$\gamma=\frac{a}{2} \text{ or } 1^\circ,$$

and assuming a variation of arc of 5′, the daily rate due to the escapement would not be more than

$$\frac{1''}{10};$$

The fifth condition is that this construction should be easy, and the article itself cheap.

All these conditions Mr. Denison says are fulfilled in the escapement he describes, and which is represented in the accompanying figure. The gravity arms are elevated by the three pinions set in the three legs of the scape-wheel. The upper pinion is shown in the figure as being about to lift the right arm. As soon as the pendulum, now going to the left, has lifted the left arm, it is carried a step away from the left tooth, which is stopped or locked by it. Each arm descends with the pendulum to a lower position than that at which the pendulum began to lift it; and thus the impulse is given. The first condition is satisfied by the addition of a fan-fly set with a friction spring in the scape-wheel arbor Approximate tripping is prevented by the length of the locking-teeth of the scape-wheel. With regard to the third condition, these long teeth render the momentary friction at unlocking quite insensible, and oil is not necessary to this action. The mathematical condition is answered without difficulty. The author recommends,

$$\gamma=\frac{a}{3}$$

as most convenient and secure. As to the last point, Mr. Denison says, "The best proof of the facility with which this escapement can be made, and its consequent cheapness, is the fact that two of them, one for a turret-clock and the other for a regulator, were made immediately from my drawings, without any mistake, by Mr. Dent's ordinary workmen, in fact, chiefly by a boy; and they say it is the easiest

escapement to make that there is. It is too soon yet to be able to give an exact estimate of the price for which these clocks can be made; but as we have now got an escapement independent of the friction of the train, and there is nothing either of difficulty or delicacy in making it, I see no reason to doubt that astronomical clocks may be made with this escapement for £20, to go better than those which have hitherto cost £80."

This escapement supersedes the necessity for a train *remontoir;* unless, as in the clock at the Great Northern Railway station in London, the great Westminster clock, and others. According to Mr. Airey's original requisitions, it is desirable to have a visible jump of the minute-hand at every half minute, where a long pendulum is used to diminish the errors due to the escapement; but turret-clocks are now being made on this plan with 1¼″ pendulums (length 61 inches). With the usual escapement the length would have been much greater. Another advantage incidental to the escapement is, that the clock may be put forward or backward any even number of beats of the pendulum without touching the pendulum, and without risk of injuring the scape-wheel.

The smaller adjustments of the Westminster clock are to be effected on the principle, that an additional weight produces the greatest acceleration of a pendulum when applied half-way between the centres of suspension and oscillation. At this point a collar is fixed, upon which is a weight of the form called a "shifter," and which is about the hundredth part of the whole weight of the pendulum. Another weight like it is to be kept in the clock-room. Taking off the permanent one for ten minutes will retard the clock a second, and putting on the other will accelerate it. The permanent regulation of the pendulum is managed in the same simple way by small weights. Its weight is 6 cwt., and one ounce accelerates it a second a day.

Mr. Denison's paper concludes by giving a great number of directions for the practical construction of the escapement in all its essential parts. The principle of the invention, however, is contained in the portions of it to which we have referred.

THE IRON TRADE.

The favourable anticipations lately entertained of the state and prospects of the iron trade have been fully realized. The orders for rails and all descriptions of manufactured iron are extremely heavy; but the pig trade, although somewhat improved, is still heavy. Some of the first houses are, it is said, holding their pigs rather than sell them at a loss. Hot blast pigs, mixed with cinder, are fetching various prices, ranging from £3 10s. to £4. Hot mine-blast pigs are realizing £4 5s. to £4 10s.; and cold blast, £4 10s. to £5.

From a statement published on Saturday morning it appears that the exports of the first five months of the present year were:

	Tons.
Bar, bolt, and rod	261,860
Wire	4,425
Wrought of other kinds	67,697
Steel	7,777
Add loss of one-third in the manufacture from pig to finished iron............	113,919
	455,678
Pig iron	117,916
Castings	22,715
	596,309
Hardware and cutlery (probably)	30,000
Machinery (probably)......	20,000
Tin-plates (probably)	30,000
	676,309

Being at the rate per annum of £1,623,142. In the year 1825 the entire make of the kingdom was only 600,000 tons.

Glasgow Pig-iron Market.—Glasgow, July 23rd.—The feeling in our pig-iron market has much improved during the past week, under the influence of the pacific aspect of the Russo-Turkish question, and the scarcity of iron for shipment. To-day, mixed numbers warrants were done at 56s. cash, at which we close buyers, sellers at 56s. 6d.; No. 1, g. m. b., 58s.

America.—By the Royal Mail-steamer *Africa,* which arrived at Liverpool on Sunday, with advices from New York to the 13th inst., we learn that the market for pig-iron was unsettled, prices ranging from 29 dollars to 30 dollars 50 cents.

The Cyclopædia of Useful Arts. Edited by Charles Tomlinson. Part XXX. George Virtue.

A considerable portion of this part of the "Cyclopædia of Useful Arts" is devoted to two highly important subjects, both of which Mr. Tomlinson has presented to his readers in his usual felicitous manner, and illustrated with beautifully executed wood engravings relating to numerous important topics. The one is on the subject of roads and railroads, which was in part treated of in the preceding part. Mr. Tomlinson is extremely minute in his description of the

best-known forms of rails, including the most recent improvements, and also in that of their bearings, pointing out the merits and demerits of each particular method. He gives ample information on the subject of curves and gradients, as to which he collects the experience of engineers. The construction of the permanent way is very fully gone into and illustrated, as is also that of the arrangement of sidings, branches, and deviations, and their subsidiary apparatus. An account of the atmospheric system of propulsion, and of the rope haulage system, concludes the article. The other article to which we alluded is on the subject of rope-making, as to which very ample information is given, and the context is aided by illustrations of the machine and of the hand processes. Passing over some minor articles, we come to a very excellent one on the saw, of which several varieties are described and illustrated, and accompanied with a notice of their manufacture and use. Screw-cutting, the use of the screw as a mechanical power, and the application of the Archimedean screw for raising water, form the subject of another article of great interest, which brings us to the end of the part. The general value of the work is well sustained in this portion of it, and the interest of its popular descriptions abundantly confirmed.

Washing by Steam.—A New York correspondent of the *Boston Transcript*, in describing the new St. Nicholas Hotel in that city, thus refers to the Steam-Washing Machine in the basement of the building:—"This is something new under the sun. Four hundred pieces are thrown into a cylinder, half filled with water and soapsuds. This is thrown into rapid revolution by a small steam engine. Steam is then let into the cylinder under the water and clothes, which raises them out of the water, passing through the pores of the fabric, and out at the top of the cylinder. The clothes are thrown down again by the pressure of steam into the suds, and so on. The changes thus produced by the rapid revolution, and by the passage of the steam through the clothing, washes them perfectly clean in the space of 10 minutes. The clothes are then thrown in a body in another cylinder, and wrung by the revolution of the cylinder, and then by letting in hot air, which passes through the clothing, they are perfectly dried, ready for ironing, in seven minutes. The whole time occupied in washing, wringing, and drying, is but 17 minutes. The advantages of this apparatus are; first, an immense saving of time and expense in washing; second, the finest cambrics can be washed without wearing them out or injuring the texture, as is necessarily done by rubbing."

PROPULSION BY MANUAL LABOUR.

To the Editor of the Mechanics' Magazine.

Sir,—I beg to offer for your useful columns what I consider would be a great improvement in working a paddle-wheel boat by manual labour, and probably lead to the adoption in practice of that mode of propulsion. Hitherto it has been usual, in all attempts of the kind, to employ a wheel having many blades, or paddles, the great reaction of which upon the water soon renders the working of it a very tedious operation, exhausts the worker, and considerably diminishes the amount of force which, under more advantageous circumstances, might be transmitted effectively to propel the vessel. The consequence is not of moment where you have the continuous force of a steam-engine, and can raise the amount of the motive power to any degree required; but in the case of manual labour it quite precludes success.

I propose obviating the defects noticed, in the plainest and most simple manner, viz., by having two blades only, set opposite each other perpendicular to a crank-handle, which would effect a similar motion to rowing, where a man can lay out his strength to the greatest advantage in pulling and pushing.

The return stroke in the water of the paddle pushed, although not equal in force with that pulled, would not be lost; and so far an advantage would be gained over the oar, that the back motion to replace the oar in the water will not be required, the alternating blade to that which is pulled being pushed, and thus a continuity of the motive force will be obtained of no inconsiderable amount.

I propose to use a crank of 6 or 7 inches, worked by a hollow cylinder-handle to avoid friction on the hands, and to steer by a captiller with ropes worked by the feet.

This great further advantage will be obtained, that the boat may be worked looking forward, and seeing where you go.

The plan admits of being applied to large boats with two or more pairs of wheel-paddles, by a connecting beam with cross-bar handles, so that four, eight, or any number of workers may be brought to bear on the two or more pairs of paddles.

In the case of small, shallow boats, as the blades to have hold in the water will probably descend lower than the keel or depth of the boat, in shoal water a pole will be necessary in landing and putting off.

I remain, Sir, &c.,

An Old Correspondent.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

Thomas Fearn, of Birmingham, Warwick, electro-metallurgist. *Certain improvements in ornamenting metallic surfaces, and in machinery and apparatus to be employed therein.* Patent dated October 1, 1852. (No. 108.)

These improvements are applicable chiefly to the ornamentation of tubes, pipes, and rods of metal, but can also be adopted for operating on strips or flat surfaces. In all cases the ornament is produced by rolling pressure. The patentee's machinery consists of a cylindrical box or drum, having an aperture through the centre, inside of which is fixed a plate or disc of metal, which has also an aperture corresponding with that on the outer casing, and on one side any desired number of grooves radiating from the centre to the circumference. Into these grooves are fitted short bearing-blocks, on which are hung small wheels revolving on pins bearing in the sides of the blocks, and on the peripheries of these wheels patterns are cut in relief, or engraved according to the design required to be produced on the tube or rod. The bearing-blocks, with the wheels hung on them, are laid in the grooves of the disc, and the cover of the casing screwed on. If it is a tube that is to be operated on, a rod of steel, tapered at one end, is inserted into the tube, and acts as a mandril. One end of the tube is then also tapered, and placed in the central aperture, and the converging rollers are driven tight against it by means of screws, by which the depth of the impression is regulated. The tube is then drawn through at a common draw-bench, when the rollers rotate, and impress on the surface of the tube the design engraved on their peripheries. When the tube has been thus ornamented, it is again drawn through a common draw-plate, to smooth its surface and sharpen the impression on it. This mode of operating gives the ornament in straight lines parallel to the axis of the tube; but when the patterns are required to run spirally, the bearing-blocks in which the figured wheels are mounted are formed in such manner that the wheels rotate in a slanting direction. In this case, the casing of the whole set of wheels also rotates round its axis, and to allow of this it is to be attached to a disc capable of revolving in a collar which embraces it. Solid rods are ornamented in a similar manner, and the figured wheels may be suspended from axes below a plane surface when flat strips of metal are to be operated on.

The claim is for the general arrangement and application of the various parts set forth, constituting apparatus or machinery for the purpose of rolling or pressing engraved or embossed designs on the surface of metal tubes, rods, or strips.

Joseph John William Watson, of Old Kent-road, Surrey, and Thomas Slater, of St. Pancras, Middlesex. *Improvements in galvanic batteries, and in the application of electric currents to the production of electrical illumination and of heat, and in the production of chemical products by the aforesaid improvements in galvanic batteries.* Patent dated Nov. 1, 1852. (No. 595.)

The *first* branch of this invention includes a variety of galvanic arrangements, in which new exciting agents and electrolytes are employed for the purpose of obtaining, simultaneously with the generation of constant electric currents, various chemical products. From the fact of these being mainly colouring matters, the patentees term their arrangements the "chromatic battery." The first of these is a modification of the Maynooth battery, in which the zinc plates are excited with sulphuric acid and a salt of cyanogen (ferrocyanide of potassium), and the iron plates with nitrous or nitric acid, alone or with a small portion of the same salt. The products are prussian blue (ferro-prussiate of iron), a light blue pigment (ferro-prussiate of zinc), nitrous fumes, &c. If excited with sulphuric acid and a cyanogen salt, a splendid blue will be the result.

The second battery has lead platinized as the negative element in a similar manner to a Smee's battery, and is excited by nitro-sulphuric acid and a salt of chromium (chromate of potash). The resulting products are chrome yellows of different depths of tint. The lead battery may have its cells of the same form as the Maynooth, and be excited as described for that arrangement, but with chromate instead of prussiate of potash.

The third battery is an iron-zinc, with or without porous diaphragms, and excited by nitrous and sulphuric acids, with chromate of potash in both cells. The product is a fine brown colour.

The fourth is a lead-Smee, with the ordinary excitants and prussiate of potash. The product is a double white of lead and zinc. The lead-Maynooth, with prussiate of potash, gives ferro-cyanides of zinc and lead.

The fifth battery is similar to the lead-batteries described, with the addition of caustic lime, by which the chromic product is deprived of a portion of its acid, and modified in colour accordingly.

The seventh battery is the Maynooth, with a saturated solution of nitrate of iron, as the excitant in the iron cells and sulphuric acid in the porous cells.

The eighth battery is an iron and zinc one, excited by sea-water or mineral-waters, with the addition of prussiate of potash.

The ninth battery has the positive metal, if zinc, excited by a double acid excitant, independent of the colour-making electrolyte. The second acid used is hydrochloric acid diluted and added to the sulphuric acid, which is also in a diluted state.

The spent acids and acid-washings can be employed for various purposes, and the fumes evolved during the process collected and applied to the manufacture of nitre, acetic ether, ammonia, and sulphuric acid.

The colours may be deepened or brightened by sulphate of manganese, sulphate of alumina or alum for blues, and chloride of strontian or chloride of barium for yellows.

The *second* branch of the invention consists in a peculiar mode of connecting the electrodes of electric lamps with the poles of the galvanic batteries, so as to produce a counter convection of particles, and cause the electrodes to waste equally, and the light to be greatly disseminated. This is effected by having two batteries, and applying the negative wire of one, and the positive of the other, to one electrode, and the positive of the second, and negative of the first, to the other electrode. This mode of applying double currents to single and opposite poles or electrodes may also be used for other purposes.

The *third* branch of the invention consists in producing heat by passing powerful currents of electricity through fine platina or iron wires coated slightly with pipeclay or plaster of Paris, or other nonconductor, and again enveloped by metallic rods, such as silver or silvered copper, which are good conductors of heat. The current first heats the platina, which transfers its heat to the pipeclay, and this becoming hot in its turn, heats the rods or tube in which the whole is enclosed.

The claims (23 in number) include the galvanic arrangements and details in connection therewith; and the modes of applying electric currents to illuminating and heating purposes, described above.

WILLIAM VINCENT, of Brick-lane, Spitalfields, Middlesex. *Improvements in cocks or taps.* Patent dated Jan. 19, 1853. (No. 129.)

In this invention the cock is formed with a tapering chamber, into and from which the fluid passes by suitable openings. The surface against which the plug works is eccentric with regard to the axis of the plug. By this means the defects resulting from wear in ordinary taps are avoided, as close contact can always be produced between the plug and its seating, after the instrument becomes worn, by turning the plug a little further round.

Claim.—The mode described of constructing and combining cocks and taps.

SYDNEY SMIRKE, of 24, Berkeley-square, Middlesex, Esq. *Improvements in apparatus for giving signals on railways.* Patent dated Jan. 19, 1853. (No. 130.)

This invention consists of an apparatus in which a cam placed upon the axle of a carriage is made to give motion to a horizontal piston-rod by means of a gab or hook on the end of the connecting-rod, which can be lifted into contact with the cam at the will of the guard. To the rod is attached a piston, with a butterfly valve, by means of which, when the gab is raised, the air is compressed in a cylinder, and then forced from it through a second valve which opens into the whistle.

Claim.—Communicating motion when desired from the axles of railway carriages to air-condensing apparatus having whistles or sounding apparatus applied thereto, for giving signals.

JOSEPH ROCK COOPER, of Birmingham, Warwick, gun-maker. *Improvements in fire-arms.* Patent dated Jan. 19, 1853. (No. 131.)

This invention relates to breech-loading fire-arms, and consists in constructing the breech so that the back part of it is moveable about an athwartship horizontal axis, which allows the fore end of the moveable piece to be raised, in order to receive the charge. For raising, returning, and fixing this breech-piece, a lever is employed which has its axis on one side of the fire-arm, and which is made with a projection that acts upon an incline attached to the side of the breech-piece. A spring is employed to assist in keeping the breech-piece in place when it is adjusted. The inventor also describes a modification of the above, in which the lever is formed in two parts, one of which is bored out to form the breech.

The inventor claims the above-stated improvements.

JOHN CRABTREE, of Heywood, Lancaster, cotton-spinner. *Improvements in machinery for winding and doubling yarns.* Patent dated Jan 20, 1853. (No. 137.)

This invention consists in applying to each spindle of machines for winding and doubling yarns a stop-lever that has a notch formed in it which embraces a flattened boss wrought upon the corresponding braid. By this means each of the spindles can be stopped at will when an end breaks, &c., and can be kept at rest until the yarn is pieced, &c., the band, meanwhile, necessarily slipping upon the wharf.

Claim.—The application of a lever and a braid with a flattened boss, or any other

equivalent agents, to the spindles of winding and doubling frames, for the purpose of stopping each spindle independently of the others.

PETER ROTHWELL JACKSON, of Salford, engineer. *The manufacture of hoops and tyres for railway wheels.* Patent dated Jan. 20, 1853. (No. 138.)

This invention consists; *firstly*, in running the metal from the blast-furnaces into inclined or vertical instead of horizontal moulds, and then using the lower portions of the pigs; and *secondly* in *twisting* the bars which are to be formed into tyres before they are made into hoops, and then placing them one within the other and welding them either by rolling or hammering, or by driving a tapering block through the heated concentric hoops which are confined around their outer edge by a block of metal.

The inventor also proposes to make the hoops of wire, or small-sized iron bars twisted together somewhat like the parts of a rope, or of a long bar of iron, twisted or not, and bent into a coil like an ordinary watch-spring.

Claims.—1. Separating the heavier from the lighter part of cast iron for the purposes described.

2. The improved modes described of manufacturing hoops for the inner parts of railway tyres.

CORNELIUS WARD, of Great Titchfield-street, Marylebone, Middlesex, musical-instrument maker. *A new construction of the musical instrument designated the bassoon.* Patent dated Jan. 20, 1853. (No. 140.)

The object of this invention is to correct the well-known imperfections of the bassoon, such as its disproportion to the size of the human hand, and the improper disposition of the apertures. Mr. Ward effects this—

1. By placing the apertures which determine the fundamental notes of the instrument at the extremities of the portions of the tube required for each, according to the laws of acoustics, and by giving to each note one aperture, independent of any other fundamental note.

2. By so arranging the keys which act upon the apertures as to afford means by which the fingers of the performer can produce and command the notes of the instrument in regular progression without inconvenient distension.

3. By so arranging the parts of the tube as to obtain the proper position of the apertures and a proper continuation of the bore at the doubling of the said parts.

The inventor claims the above, and also an arrangement of the joints or several parts of the tubing of the bassoon whereby the "double piece" of the old one is dispensed with, and instead of it the bore is continued by a curve joint.

CORNELIUS WARD, of Great Titchfield-street, Marylebone, Middlesex, musical instrument-maker. *Combining the musical instruments designated the drum and the cymbals in such manner as to make them as one instrument; which instrument he terms the cymbal-drum.* Patent dated January 20, 1853. (No. 141.)

The character of this invention will be readily seen from the claim, which is the placing of the cymbal or cymbals in the interior of the drum, and a means of then using the drum separately and the cymbals separately, or both instruments simultaneously.

RICHARD MOUNTFORD DEELEY, of Audman Bank, Stafford, glass manufacturer. *Improvements in the grates of furnaces used in the manufacture of glass.* Patent dated January 20, 1853. (No. 142.)

The object of these improvements is to obtain a better draught and greater heat, and to enable small fuel or slack to be burned without choking the grate-bars. This is effected by constructing the grate so that a current of air may be admitted to the fire, not only from beneath, but from the ends or sides, or both; for which purpose the grate is hung lower than the seige, and the ends and sides are formed of bars or perforated plates of metal, in lieu of or in addition to which perforated brick-work may be used, or the seige or bed of the furnace itself perforated. The same mode of securing lateral draught may be applied in all forms of furnaces.

Claim.—The erection of grates as described for glass-house furnaces, whereby the air, having a greater space to act upon, the fire increases the combustion, and produces a greater heat.

2. The erection of glass-house furnace-grates with perforated bricks, as described.

WILLIAM RIDDLE, of East Temple Chambers, Middlesex. *Improvements in ornamenting walls, ceilings, and other surfaces.* Patent dated January 20, 1853. (No. 144.)

This invention consists in using glass, rolled or pressed, in pieces with raised figures on their surfaces in forming ornamental designs. The pieces are coloured with copper foils, or other substances placed at their backs, or are left uncoloured, if desired, and are combined according to the designs required. The glass is moulded by the ordinary process, and, when moulded, may be trimmed, ground, or polished. In the process of decoration, the pieces of glass are not separately attached to the ornamented surface, but to boards or panels, for the sake of convenience. The

lustrous effects of these embellishments of glass may be subdued, if necessary, by the introduction of some less brilliant substances between them, as gilt mouldings, blue or crimson ornaments, or surfaces of stone or polished wood.

AUGUSTUS THOMAS JOHN BULLOCK, lieutenant, Royal Navy. *Improvements in taps and cocks.* Patent dated January 20, 1853. (No. 146.)

This invention consists in adding a safety-catch to cocks and taps, so as to prevent their being turned by anything coming accidentally in contact with them. For this purpose an aperture is formed through the handle and partially down the plug; a second aperture is formed at right angles, or nearly so, to the former, and also a notch or groove in the top of the barrel of the tap. A rod is then placed in the vertical aperture, which rod acts upon a lever or bolt in the horizontal aperture, and raises it out of the groove in the barrel, on being pressed by the finger.

Claim.—The addition to cocks and taps of a safety-catch, for the purpose of preventing the accidental opening thereof.

WILLIAM WILLIAMS, of Eccleshall, Stafford, engineer. *Improvements in refrigerating apparatus.* Patent dated January 20, 1853. (No. 147.)

Claims.—1. The employment of cylinders fitted with plungers in place of pistons in apparatus used for the compression of air for refrigerating purposes.

2. The construction and arrangement of a separate condensing or absorbing-chamber, in which the compressed air has its heat (which is generated by compression) absorbed, by being caused intimately to mingle with water or other fluid, of a temperature below that of the air forced therein, as above explained.

3. The placing of the compressing cylinders, and the condensing or absorbing-chamber, and parts connected therewith, in a tank of cold water, kept constantly supplied for the purpose of aiding in keeping the same cool.

4. He claims the arranging and combining valves in connection with the refrigerating apparatus, whereby air compressed and cooled may be caused to expand in immediate contact with the water or other matters to be cooled.

GEORGE CARTER, of Nottingham Lodge, Kent, gentleman. *Improvements in the construction of furnaces.* Patent dated January 21, 1853. (No. 148.)

The inventor claims the following as his improvements:

1. Dividing the ash-pits of furnaces transversely at the centre, or thereabouts.

2. Supplying each division of ash-pits so constructed with atmospheric air, by independent and regulated inlets.

3. Constructing the flues narrow and deep.

GEORGE THORNTON, of the Grange, Gargrave, Yorkshire, engineer. *Certain improvements in propelling vessels.* Patent dated January 21, 1853. (No. 152.)

Claim.—The construction of a propeller or propellers composed of submerged water-cylinders, with pistons working air-tight therein, and so arranged and combined with other apparatus as to be made alternately to thrust against the water and to recede from it, a vacuum being formed within the cylinders before the pistons.

JAMES MIDDLEMASS, of Edinburgh, Mid Lothian, Scotland, merchant and outfitter. *The application of a new material to the construction of portable houses and other buildings.* Patent dated January 21, 1853. (No. 153.)

The title of this patent by no means characterizes the invention, unless zinc is a "new material," which the inventor would experience some difficulty in showing.

The claim is stated more distinctly; it is the use of zinc as the material out of which the sides or walls and roofs of buildings may be constructed. How the inventor can now claim the use of *zinc* in the construction of roofs, we are at a loss to discover, since zinc roofs have been common in the country for many years.

WILLIAM EDWARD NEWTON, of Chancery-lane, Middlesex, civil engineer. *Improvements applicable to clocks and other timepieces, for the purpose of indicating not only the time of the day, but the day of the week, the month, and the year; which invention he intends to denominate, "Hawe's Calendar Clock or Timepiece."* (A communication.) Patent dated January 21, 1853. (No. 154.)

The principal object of this invention is to show the day of the week, the month, and the year, by means of a train of wheelwork which is independent of the clockwork, and is acted upon once in twenty-four hours, by an independent spring or other motive agent.

MATTHEW ANDREW, of Hyde, Chester, clerk. *Certain improvements in fastenings for windows.* Patent dated January 21, 1853. (No. 156.)

This invention chiefly relates to windows formed with sliding sashes, and consists in applying to them self-acting apparatus, which at the same time secures the sashes, hinders their shaking, and prevents draughts. One part or sash of the window is furnished with an inclined plane or projection, which passes under an inclined loop or staple fixed upon the other part when the window is raised, and the two

sashes are thus brought into close contact. The staple is provided with a small spring bolt that shoots into a catch or notch formed in the inclined projection, thus securing the two sashes until the said bolt is withdrawn by hand.

William Joseph Curtis, of 23, Birchin-lane, London, civil engineer. *An invention for excavating or digging earth, and for carrying or delivering the soil.* Patent dated January 21, 1853. (No. 158.)

The chief parts of the machines described by the inventor consist of a series of picks like stampers, which break up the soil, and a train of buckets which follow, and lifting up the loose earth, discharge it into a series of buckets, trays, or wagons working horizontally, or on an incline if the excavated soil is to be carried up an embankment. A sufficient number of picks may be employed to cover any width of cut, and the buckets are so arranged that they take the ground and discharge in succession.

Claims.—The employment of picks in combination with dredging-buckets, or other equivalent machinery, driven by steam and working upon a traversing frame which moves or works upon a cross-frame, having a movement at right angles to it, and the combination of machinery and apparatus of trays and buckets, or wagons, or trucks for conveying the soil from the excavating-machine to a distance. Also, certain machinery and apparatus described.

Reuben Plant, of Brierly Hill, Stafford. *Improvements in the construction of glass-furnaces.* Patent dated January 21, 1853. (No. 159.)

This invention is applied to that class of glass-house furnaces in which the heat rises up from below through an opening in the surface on which the pots are placed, and consists in placing the fire-bars so that they shall be lower at their centres than at their extremities, in order that the fuel shall have a tendency to slide down towards the centre of the fire; and since the feeding with fresh coal will take place at the end or ends of the fire, the most heated fuel will always be at the centre. The inventor also admits air above the fire-bars and below the bed of the furnace, by making below the bed channels communicating with the atmosphere.

John Chubb, of St. Paul's Churchyard, patent lock manufacturer, and John Goater, lock maker. *Improvements in locks and latches.* Patent dated January 21, 1853. (No. 160.)

The first of these improvements consists in forming the sliding-bolt of a lock in two parts, the one hinged to or moving on the other, a spring being applied between the parts of the bolt with a tendency to keep them correctly together. The key only acts on the moveable part of the bolt, and any pressure put on the bolt for the purpose of acting on the tumblers separately will be interfered with by the moveable part which rises so as to press against the stump. The tumblers are provided with inclined projections, which, acting against a stud on the moveable part of the bolt, cause it to rise when the bolt is shot; and any applied pressure tending to force the bolt back is resisted by the stump till all the tumblers are lifted to their correct positions by a true key. The lock is provided with a screen to the keyhole and detectors to the tumblers.

Another improvement is, that on the screen is affixed a false bit, which acts on the tumblers when the screen is turned, but not correctly, unless it is turned by the proper key. This part of the invention is more particularly applicable to latches or locks with lifting bolts.

Louis Jules Joseph Malegue, of Paris, France, dyer. *A certain colouring composition for dyeing tissues or stuffs of silk and cotton.* Patent dated January 22, 1853. (No. 161.)

The inventor prepares his colouring composition for dyeing rose colour thus:—Four ounces of ammoniacal cochineal are dissolved in a quart of hot water and boiled for ten minutes, after which 88 grains of salt of tin, 140 grains of crystals of tartar or bitartrate of potash, 1 oz. of saturated aqueous solution of sulphurous acid, and 140 grains of the solution of tin are added; the whole is then boiled for about half an hour and then allowed to cool in a glass or earthenware vessel, and afterwards decanted into another vessel. Two ounces of the carmine of safranum are then added, and well mixed with the solution. A small quantity of this composition is then mixed with a quantity of hot water, and tartaric acid is added in the proportion of about 1 oz. to 8 or 10 gallons of water, and then an additional quantity of the dye added sufficient to produce the required rose-tint.

The *solution of tin* above mentioned is formed by dissolving 9 parts, by weight, of pure tin in 5 parts of nitric acid and 18 parts of muriatic acid.

The *ammoniacal cochineal* is produced by boiling finely ground cochineal in twice its weight of solution of ammonia for several hours. The mixture should be well stirred, and when it becomes thick it should be placed upon a cloth stretched on a piece of wicker-work and dried in a stove, and then cut or broken into pieces.

The *salt of tin* is prepared by dissolving pure tin filings or grains in muriatic acid, to which has been added one-fifth part of

its weight of nitric acid, and then evaporating the solution in a water-bath till the solid salt is obtained.

For dyeing purple the process is the same, with the exception that 350 grains of solution of tin are employed instead of 140, and 1½ oz. of carmine of safranum instead of 2 oz.

BENJAMIN QUINTON, of Birmingham, Warwick, manufacturer. *A new or improved fastening for brooches and other articles of jewellery and dress.* Patent dated January 22, 1853. (No. 162.)

In this invention the brooch or other article has two plates or shoulders projecting from the back of it, one of which has a plain hole formed in it through which the point of the pin passes, and the other has a wormed hole into which a screw formed on the shoulder of the pin takes. In attaching a brooch formed on this principle to a garment, the point of the pin would be passed first through the wormed hole, then through the garment, and lastly through the plain hole in the plate at the other end of the brooch, after which a cap, formed to cover the point of the pin and attached to the shoulder of it, is put upon the point, and the pin is then screwed in.

JOHN MEDWORTH, of 9, Claremont Cottages, Campden-hill, Kensington, and LAWRENCE LEE, of 498, New Oxford-street, both of Middlesex. *Improvements in lithographic presses* Patent dated January 22, 1853. (No. 167.)

This invention consists in causing the presser or scraper to be mounted in a moving frame in such a manner that when it moves in one direction it will be upright and perform its pressing or scraping action, but when it is moved in the opposite direction this action ceases, the presser assuming an inclined position. The motion of the presser in opposite directions is produced by means of a rack and pinion, and the tympan is caused to rise from the stone by the action of a weight. In order to regulate the application of the pressure by making it effective at the proper place, a support is fixed to the bed or framing of the press which upholds the scraper till it arrives at the part where the pressing should commence. A guide-wheel, which runs upon a raised adjustable plane, is attached to each side of the scraper, for the purpose of adjusting the pressure.

Claim.—The mode described of combining and working the part constituting the swinging-head, which carries the scraper; the self-acting tympan; the regulating of the point at which the pressure is to commence; and the adjustment of the pressure as explained.

PETER HUBERT DESVIGNES and FRANCIS XAVIER KUKLA, both of Lewisham, Kent. *Improvements in galvanic batteries.* Patent dated January 22, 1853. (No. 169.)

This invention has for its object the use of metals more electro-positive than gold or platinum in the construction of galvanic batteries. The metals employed are tellurium, chronium, vanadium, uranium, molybdenum, tungsten, wolfram, columbium, tantalum, titanium, palladium, rhodium, iridium, osmium, and antimony.

Claim.—The employment of antimony and the other metals mentioned above, as electro-positives of galvanic batteries, employing therewith suitable electro-negative metals.

ARTHUR WELLINGTON CALLEN, of Peckham, gentleman, and ABRAHAM RIPLEY, of Westminster-road, engineer. *An improvement in the modes of giving and transmitting multiplying rotative motion to shafts and other revolving bodies.* Patent dated January 22, 1853. (No. 170.)

In this invention the shaft which is to receive the multiplied motion carries a disc on its extremity, which disc has its centre coincident with that of the shaft, and is formed with radial grooves on its off side. The shaft which is to communicate the motion is placed with its axis not in but parallel to the direction of the axis of the former shaft, at a short distance from the centre of the disc, and carries at its extremities two or more arms, which have rollers fixed on the sides thereof working into the grooves before mentioned. By properly arranging the shafts, it is evident that the multiplying number may be fixed at choice.

Claim.—The application of the grooved disc and double or treble cranks, with friction-wheels or rollers running in the said grooves, for the purpose of multiplying rotative motion.

HENRY BRINSMEAD, of St. Giles-in-the-Wood, Devon, machine-maker. *Reaping all kinds of corn.* Patent dated January 24, 1853. (No. 171.)

In Mr. Brinsmead's machine the corn is cut by means of three or more revolving cutting plates at the front, which overlap each other and work in double-guard teeth, by which the corn is held steady during the act of cutting. When cut it falls on to a table placed at an angle of about 45°, which has several horizontal apertures through it, in which work pegs attached to the surface of an endless belt, by which the corn falling on the table is carried along it to another set of belts which convey it to the sheaver. This consists of a shaft standing nearly at the same angle as the inclined table, to which are attached four sets of radial arms and a circular plate at bottom,

on which the ends of the cut straw rest. The sheaver is thus divided into four compartments, each of which in turn receives a portion of the cut corn and delivers it periodically at the side of the machine, when acted on by a lever under control of the attendant. The machine is drawn by one or two horses, which walk alongside of the standing corn, and one attendant only is required to drive and manage the whole.

No claims.

David Clovis Knab, of Rue Rossini, Paris, and South-street, Finsbury, London, operative chemist. *Improvements in the process of and apparatus for distilling certain vegetable and mineral matters, and also animal bones and flesh.* Patent dated January 24, 1853. (No. 174.)

These improvements consist in distilling certain matters by the direct or indirect contact of a bath of molten metal, and varying the metal composing the said bath, in order to produce the degree of heat suitable for the distillation of the respective matters at the lowest possible temperature, by which means the quality of the products is improved and the quantity of them increased.

Donald Beatson, of Mile-End, Middlesex. *Improvements in the means of propelling ships and other floating bodies.* Patent dated January 24, 1853. (No. 175.)

This invention relates to screw-propellers, and consists in forming their blades with corrugated surfaces. The directions of the corrugations are in circles about the centre of the screw extending across the blades. The inventor also proposes to add ridges to existing screws; his object being in both cases to increase the hold of the propellers on the water.

William Nairne, of South Inch Mill, Perth, flax-spinner. *Improvements in dressing yarns for looms.* Patent dated January 24, 1853. (No. 176.)

This invention consists in causing the yarn to be supplied with dressing in an undiluted state. The apparatus for this purpose is composed of a box, in which revolves at a slow speed a roller, having a straight edge or doctor applied to it, capable of being set at any required distance so as to regulate the amount of dressing which the roller shall carry up. There is also a moveable slide in the box, which is moved gradually forward, so as to bring up the supply of dressing against the roller. The dressing is applied to the yarns by a brush or brushes, revolving above and lightly in contact with the roller.

Claim.—The application by machinery of undiluted dressing to yarns dressed by machinery for power-looms.

Charles Randolph and John Elder, both of Glasgow, Lanark, engineers. *Improvements in propelling vessels.* Patent dated Jan. 24, 1853. (No. 177.)

The object of this invention is to employ the expansive power of steam with greater advantage than is gained in the ordinary marine engines. For this purpose an expansive engine is constructed with two cylinders of different sizes, which are so arranged that the steam passes from the boiler into the smaller cylinder, and acts there with its full power, and then is admitted to the larger cylinder, and allowed to act there expansively.

Claim.—The application to the propelling of steam-vessels of engines having double cylinders, for the purpose of using steam expansively.

William Kendall, of Blawith, near Ulverston, wood turner. *Improvements in the manufacture of boxes and similar articles, and in the machinery or apparatus to be employed therein.* Patent dated January 24, 1853. (No. 178.)

The patentee's machinery consists of a horizontal spindle carrying a chuck, which is fitted with a projecting circular gauge of the size of the outside of the box to be hollowed. In the centre of the chuck and gauge is a small cutter fitted into a second revolving chuck, so that a portion only of the cutting edge projects beyond it. The wood blank is first turned in a separate lathe to the required diameter, and of a length capable of producing several boxes. It is then placed, with its axis coinciding with that of the cutter spindle, and is urged along by a runner, its end being inserted in the gauge while the revolving cutter scoops out the wood. This forms the hollow of the box, and the piece so hollowed out is then severed from the blank by a cross-cutting saw.

Claims.—1. The general arrangement of machinery or apparatus described.

2. The system of cutting out or shaping boxes and other similar articles by means of a rotary cutter and gauge guide combined.

3. The manufacture of boxes and similar articles from one length of blank severed or divided for the purpose.

4. The system of cutting out boxes and similar articles by an adjustable rotary cutter, as described.

John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. *Improvements in aërial navigation, and in the machinery or apparatus employed therein.* (A communication.) Patent dated Jan. 24, 1853. (No. 179.)

The apparatus specified under this patent consists of a balloon of an elongated form, from which is suspended a platform or frame to carry the propelling, directing, and governing machinery, and the aëronauts

There are four wheels fixed at the extremities of two transverse parallel shafts, set in motion by a small steam-engine, which, with its boiler, is placed in any convenient part of the frame, and a number of wings or paddles are placed on the ends of arms extending from the shafts of these wheels, for the purpose of counteracting the effect of the air against the balloon; on each side of the platform is an apparatus similar to an umbrella or parachute, which, by alternately opening and closing, exerts a propelling power. A series of horizontal wings form a means of regulating the ascent and descent of the balloon, and sliding weights are used, by which the centre of gravity of the whole can be changed, and its angle of inclination determined. The balloon is furnished with a rudder similar to that of a ship, by which its course through the air may be governed.

The claims are for the general arrangement and details as described.

John Stevenson, of Dungannon, Tyrone, spinner. *Improvements in machinery for spinning flax and tow.* Patent dated January 24, 1853. (No. 180.)

These improvements consist in forming the bobbins and flyers of flax and tow spinning-machinery of a conical shape, the bobbin being built up in this peculiar form instead of that usually adopted. The motion of the builder is so regulated as to wind the thread on to the bobbin at each point in the requisite proportions to produce this effect, and the drag on the bobbin is so governed by means of the sliding-rail, in front of the builder, that it shall be greatest when the builder rises to the top of its traverse, and the thread is being wound on to the thick part of the bobbin. The upper ends of the flyers are pierced with guide-grooves for the threads, which are brought down perpendicularly from the drawing-rollers instead of at an angle as customary; and the use of these guide-grooves enables the threads to be held steady, without the employment of thread-plates.

Claim.—The employment in machinery for spinning flax and tow of conical flyers and conical bobbins in combination with arrangements for regulating the drag on the bobbins and threads as described.

Warren Fisk Shattuck, of the Strand, Middlesex, engineer. *A smut-machine.* (A communication.) Patent dated January 25, 1853. (No. 182.)

The complete specification of this patent was filed at the time of application.

The patentee claims—1. Certain grates on the top of his machine, in combination with scrolls or spiral chambers and spouts for discharging smut and other light materials carried up by the blast.

2. A chamber at the bottom of the cylinder, which concentrates and gives free discharge to all foreign matters that are to be separated from the grain by a blast in the last stage of the operation.

3. The use of certain distributors in combination with the concave bottom of the cylinder.

4. The combination of draught-floats and screws for cleansing grain.

5. Certain perforated scourers, formed as described.

6. Certain ventilators at the top of the machine.

7. A rubber constructed of wood, covered with sheet-iron, and filled with spikes.

8. The combination of scourers with cones and fans, and certain modifications thereof.

William Thomas Henley, of St. John-street Road, London, electrical engineer. *Improvements in covering, laying, and uniting wires and ropes for telegraphic purposes, and in the machinery employed therein.* Patent dated January 25, 1853. (No. 185.)

The first part of this invention relates to covering wires spirally with iron wire, either galvanized or other, for the purpose of protecting them from violence. The inventor also describes certain machinery to be employed in covering the wires, and proposes to form submarine ropes in short lengths, connecting these with iron clamps, instead of making them in long lengths, as is now practised.

Frederick Simpson, of Red-hill, Surrey, cement merchant. *Improvements in combining materials for cleansing or whitening stone.* Patent dated January 25, 1853. (No. 187.)

The inventor describes a mixture formed of hearthstone, fuller's earth, or carbonate of lime, intended to be used instead of hearthstone alone. He prefers the following proportions: hearthstone 10, fuller's earth 30, and carbonate of lime 60 parts.

John Sangster, of Cheapside, London. *Improvements in umbrellas and parasols.* (A communication.) Patent dated July 25, 1853. (No. 188.)

The patentee describes and claims a method of fitting the joints of the sticks of umbrellas and parasols. He employs a tube with slits formed in it, which is capable of being turned round, and which embraces the two parts of the stick. The pieces of metal which form the joints fold into the slits when the stick is doubled, the tube being previously arranged for the purpose. When the umbrella or parasol is to be used the stick is straightened and the tube turned round.

Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. *Improvements in the manufacture of printing*

surfaces. (A communication.) Patent dated January 25, 1853. (No. 189.)

These improvements relate to processes of stereotyping.

Claims—1. The making stereotype matrices of either, or of a combination of both, of two mixtures, the first of which is composed of plastic clay, silica, paper pulp, and molasses; and the second of fine clay, paper pulp, and fine dehydrated plaster of Paris.

2. The use of cloth or some analogous substance in placing the second coat above the first upon the matrix plate.

3. The employment of a gutta percha film for covering the face of the type, and preventing the moisture of the fresh coating from reaching the surface of the type.

4. The use of a mixture composed of fine silicious sand, gum shell lac, and tar for forming stereotype plates.

5. The employment of a clay coating, in combination with wax and oil, for the purpose of preparing tablets suitable for writing and drawing upon, and for being used as matrices for producing stereotype plates or casts.

6. A method described of giving elevation to the spaces between the lines of writing on the tablet, for the purpose of affording the requisite relief to the letters in the cast.

7. Certain lithographic processes described.

John Edwin Mayall, of Regent-street, Middlesex, photographist. *Improvements in the production of crayon effects by the daguerreotype and photographic processes.* Patent dated January 25, 1853. (No. 193.)

This invention relates to the production of imitation crayon drawings or portraits by the photographic process by means of a mechanical contrivance interposed between the object and the camera. This contrivance consists of a slowly revolving disc, with a central aperture in it of the form of a star, and sufficiently large to admit the rays from that part of the object which is to be shown in strong light, or as a firm sharp image, whilst the rays from those exterior parts which are to be gradually shaded or deepened off to a dark or bright background are partially intercepted by the converging parts of the star.

Claims.—1. The system or mode of producing crayon photographs, as described.

2. The application and use of rotary stellar discs for graduating the photographic rays.

COMPLETE SPECIFICATION FILED WITH APPLICATIONS.

Donald Brims, of 159, Southwark-bridge-road, Surrey, engineer. *Improved safety apparatus for the protection and preservation of life on water.* Specification deposited July 19, 1853. (No. 1711.)

The inventor's apparatus consists of a boat built of either wood or iron, the hull of which forms a close vessel provided with apertures for ingress and egress. The boat is fitted with a jointed mast, sails, feathering paddles, a screw-propeller, and indeed all the apparatus that is necessary for working a vessel at sea; and the whole is so arranged as to admit of being worked by hand from the inside. In the event of a ship, supplied with a boat constructed according to Mr. Brim's invention, meeting with such an accident at sea as endangered the lives of the passengers, these, says the inventor, might immediately enter the safety-boat through the man-holes, and, if necessary, cast themselves adrift from the ship at once. From an inspection of the drawings furnished, however, we are led to fear that the inmates of the vessel would meet with extreme difficulty in disposing of themselves among the machinery, should they be successful in effecting the passage of the man-hole.

PROVISIONAL PROTECTIONS.

Dated May 28, 1853.

1322. Henry Charles Hill, of Kingsland-road, London, engineer. Improvements in machinery and apparatus for the manufacture of hats, caps, and bonnets.

Dated June 4, 1853.

1375. John Chisholm, of Holloway, Middlesex, practical chemist. Improvements in the production or manufacture of artificial manures.

Dated June 10, 1853.

1418. Henry Eld Symonds, of Seacombe, near Liverpool. Improvements in preserving meat.

Dated June 16, 1853.

1463. Peter Armand Lecomte de Fontainemoreau, of Rue de l'Echiquier, Paris, and South-street, Finsbury, London. Improvements in the preparation of certain vegetable and alimentary substances. A communication.

Dated June 20, 1853.

1510. Robert Galloway, of Cartmell, Lancaster. Improvements in manufacturing and refining sugar.

Dated July 4, 1853.

1594. Charles de Bergue, of Dowgate-hill, London, engineer. Improvements in the manufacture of railway wheels.

Dated July 6, 1853.

1607. Thomas Newey, of Garbett-street, Birmingham, steel pen tool-maker. Improvements in fastenings for wearing apparel.

1608. Peter Erard, of Marseilles, France, civil engineer. Certain improvements in steam boilers.

1609. Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, London, and Rue de l'Echiquier, Paris. Improvements in typographical printing-presses. A communication.

1610. John Hood, of Glasgow, Lanark, and Wil-

liam Hood, of the same place, manufacturers. Improvements in the treatment or manufacture of ornamental fabrics.

1612. Peter Gaskell, of Manchester, Lancaster, manager. Improvements in elastic springs.

1613. Thomas William Kennard, of Duke-street, Adelphi, Middlesex, civil engineer. Improvements in iron bridges.

1614. James Bradshaw and Thomas Dawson, of Blackburn, Lancaster. An improved shuttle-skewer.

1615. Robert Anderson Rüst, of Regent-street, Middlesex, pianoforte-manufacturer. An improvement in pianofortes.

1616. John Woodward, of Platt-street, Middlesex, office clerk. An apparatus for curling hair.

1617. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improvements in locks and latches. A communication.

Dated July 7, 1853.

1618. Henry Bate, of New Hampstead-road, Kentish-town, surgeon. A new fire-escape, which he denominates the "Ignevador."

1619. James Cheetham the younger, of Manchester, cotton-spinner. Improvements in machinery for cutting fustians, velvets, and other similar fabrics. A communication.

1620. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, London. Improvements in logs for indicating the speed of ships and other vessels. A communication.

1621. Alexander Angus Croll, of Howrah-house, East India-road, one of the sheriffs of London and Middlesex. Improvements in apparatus used in the manufacture of gas.

1622. Christopher Vaux, of Brixton, Surrey. Improvements in floating breakwaters.

1623. John Knox Stuart, of Glasgow, Lanark, surgeon. Improvements in hats and other coverings for the head.

Dated July 8, 1853.

1624. Benjamin Dangerfield, of West Bromwich, Stafford, engineer, and Benjamin Dangerfield, jun., of West Bromwich aforesaid, engineer. Improvements in constructing and fixing the rails of railways.

1625. Louis Cornides, of Trafalgar-square, Middlesex. Improvements in treating certain ores and minerals for the purpose of obtaining products therefrom.

1626. William Marsden, junior, of Longridge, Lancaster, manufacturer, and Samuel Roscow, of the same place, mechanic. Certain improvements in looms for weaving.

1627. William Maddick, of Manchester, Lancaster, manufacturing chemist. An improved mode of treating madder and munjeet, by which the quality of the colouring matter contained in those substances is greatly improved, and its application to dyeing and printing much facilitated.

1628. William Robertson, of Rochdale, Lancaster, machine-maker. Improvements in machinery or apparatus for preparing, spinning, and doubling cotton, wool, and other fibrous substances.

1629. Jacob Brett, of Hanover-square, Middlesex. Improvements in photography.

1630. Louis Brunier, of Norfolk-street, Strand, Middlesex, engineer. Improvements in obtaining power by compressed air.

1631. Stephen Martin Saxby, of Brussels. Improvements in apparatus for lowering ships' boats, and for holding and letting go tackle.

1632. Moses Poole, of the Avenue-road, Regent's-park, Middlesex. Improvements in the manufacture of printing-rollers.

1633. Philippe Poirier de St. Charles, of Fulham, Middlesex, engineer. Improvements in apparatus for measuring and indicating the distance travelled by cabs and other vehicles.

Dated July 9, 1853.

1635. Thomas Restell, of the Strand, Westminster, chronometer-maker. Improvements in walking-stick umbrellas, applicable also to parasols.

1636. Ewald Riepe, of Finsbury-square, Middlesex, chemist. Improvements in the manufacture of turret or clock-tower and such like bells. A communication.

1637. Ewald Riepe, of Finsbury-square, Middlesex, chemist. Improvements in moulds for steel castings. A communication.

1638. Henry Hoskyn Peppin, of New Bond-street, Middlesex, umbrella and parasol manufacturer. An improved joint for umbrella and parasol-sticks. A communication.

1639. Jean Theodore Boulé, of Paris, and François Cailland, also of Paris. Improvements in composing and distributing type.

1640. Frederick Meyer, of Paradise-street, Lambeth. Improvements in the manufacture of candles and night-lights.

1641. Pierre Auguste Tourniere, of Laurie-terrace, St. George's-road, Surrey, gentleman, and Louis Nicolas De Meckenheim, of Birmingham, Warwick, gentleman. Improvements in the manufacture of soap and washing-paste, and of the materials used therein.

1642. Mark Sprot, junior, of Garnkirk, Lanark, gentleman, and Robert Denholm, of the same place, engineer. Improvements in the manufacture of pipes or hollow articles from plastic materials.

1643. George Pearson Renshaw, of Nottingham, civil engineer. Improvements in cutting and shaping.

1644. William Skinner, junior, of Glasgow, Lanark, merchant. Improvements in windows, shutters, and apparatus connected therewith.

Dated July 11, 1853.

1646. Peter Fairbairn, of Leeds, York, machinist. Improved machinery for heckling flax, hemp, china-grass, and other fibrous materials.

1648. Fabian Wrede, of Stockholm, Sweden. Improvements in gas and air-engines.

1650. George Dalton, of Lymington, Southampton, gentleman. Improvements in reverberatory and other furnaces.

Dated July 12, 1853.

1652. Joseph Bacon Finnemore, of Easy-row, Birmingham, Warwick, manufacturer. Improvements in sofa-springs useful for spring-stuffed upholstery work generally, and in the adaptation thereof to mattresses.

1654. Patrick Cowan, of Skinner-street, Middlesex, lamp-manufacturer. Improvements in gas-fittings.

1656. Andrew Burns, of Glasgow, Lanark, iron shipbuilder. Improvements in constructing iron ships, boats, boilers, and other metallic structures.

1658. James Fletcher, of Facit, near Rochdale, Lancaster, manager. Certain improvements in machinery used for spinning, doubling, and winding cotton, wool, flax, silk, and other fibrous materials.

1660. Nesserwanjee Ardaseer, of Bombay, in the Honourable East India Company's service. A method of driving shafting, so as to obtain two revolutions of a screw or other shaft to one revolution of a driving-shaft, or to obtain the converse result.

Dated July 14, 1853.

1670. The Honourable Sir Richard Brown, baronet, of Sphinx-lodge, Chelsea, Middlesex. Improvements in coffins, catacombs, sarcophaguses, and cenotaphs.

1674. André Louis Jules Lechevalier St. André, of Albany-street, Regent's-park, gentleman. Certain improvements in packing goods, so as to in-

crease the facility and safety of their transmission from place to place.

PATENTS APPLIED FOR WITH COMPLETE SPECIFICATIONS.

1662. Abraham Walker Craig, Daniel Foster, and Thomas Valentine, of Belfast, Antrim, Ireland, flax-spinners. Improvements in preparing for weaving wet spun yarns of flax and tow. July 13.

1684. Patrick O'Malley, of Dublin, brewer. A new liquid beverage. July 15.

1711. Donald Brims, of No. 159, Southwark Bridge-road, Southwark, Surrey, engineer. An improved safety apparatus for the protection and preservation of life on water. July 19.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," July 22nd,* 1853.)

393. George Stiff. Certain improvements in manufacturing paper.

502. George Duncan. Improvements in steam boilers.

503. Peter Armand Lecomte de Fontainemoreau. Improvements in drying cigars. A communication.

(*From the "London Gazette," July 26th,* 1853.)

621. William Muir. Improvements in machinery or apparatus for grinding edge tools and other articles.

641. William Bashall, junior. Improvements in dressing, sizeing, and tape-machines.

680. John Eldridge. Washing woollen, linen, cotton, silken, hempen, skin, and flaxen materials and substances, and called "the rotary washing-machine."

817. William Pidding. Improvements in the manufacture of woven, textile, or other fabrics, and in the machinery or apparatus connected therewith.

821. William Pidding. Improvements in the preparation or treatment of twine or other threads or cuttings of paper, or other waste, for the production of useful and ornamental articles.

153. Joshua Farrar. Improvements in the treatment of flax, line, grasses, and other fibrous substances.

978. Thomas Knowles. Improvements in the machinery or apparatus for picking warps.

1139. Peter Wright. Improvements in the construction or manufacture of tew-irons.

1228. John Barsham. Improvements in drying bricks, peat, and other articles.

1229. John Barsham. Improvements in charring peat and other vegetable substances, and in burning lime.

1315. Richard Archibald Brooman. Improvements in abdominal supporters. A commmunication.

1374. Joseph Gyde. Improvements in mills and apparatus for grinding and dressing corn and various substances.

1431. Thomas James Perry. An improvement or improvements in raising and lowering Venetian and other blinds, applicable also to the raising and lowering of other bodies.

1570. George Arthur Biddell. Improvements in apparatus for cutting vegetable and other substances.

1576. Williams Rice. Improvements in harness for horses and other animals, and in the manufacture of springs for the same.

1580. Edward Davies. Improvements in machinery or apparatus for carding or otherwise preparing cotton or other fibrous materials to be spun, and also for cleaning or stripping cards used in the said operations.

1622. Christopher Vaux. Improvements in floating breakwaters.

1625. Louis Cornides. Improvements in treating certain ores and minerals for the purpose of obtaining products therefrom.

1632. Moses Poole. Improvements in the manufacture of printing-rollers. A communication.

1638. Henry Hoskyn Peppin. An improved joint for umbrella and parasol sticks. A communication.

1643. George Pearson Renshaw. Improvements in cutting and shaping.

1646. Peter Fairbairn. Improved machinery for heckling flax, hemp, China-grass, and other fibrous materials.

1648. Fabian Wrede. Improvements in gas and air engines.

1662. Abraham Walker Craig, Daniel Foster, and Thomas Valentine. Improvements in preparing for weaving wet spun yarns of flax and tow.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed July 22, 1853.

1853:

170. Arthur Wellington Callen and Abraham Ripley.
178. William Kendall.
210. Robert Shaw.
258. Frederick Lawrence, William Davison, and Alfred Lawrence.
374. George Henry Bursill.
394. Adolphe Nichole.
712. Charles William Siemens and Joseph Adamson.
910. William Ogden.
1103. John Rowe, jun.
1212. George Jones.
1248. Edward Jones Schollick.
1266. William Simson.
1286. Jonathan Dodgson Carr and John Carr.
1294. William Wareup.
1298. William James Harvey.
1303. William Henham.
1318. Daniel Bateman.

Sealed July 23, 1853.

175. Donald Beatson.
176. William Nairne.
185. William Thomas Henley.

Sealed July 26, 1853.

197. Nicholas Francisque Ador.
229. Francis Whishaw.
233. Marcus Spring.
256. David Chalmers.
347. Isaiah James Machin.
361. Charles Breese.
531. Charles Humpage.
841. Leopold Joseph Green.
941. Lambert Adolphe Beauvais.
1107. John Whiteley.
1109. Thomas Symes Prideaux.
1134. Edward Blackett Beaumonz.
1182. George Stiff.
1183. William Thomas.
1249. Samuel Schollick.
1295. Alphonse Rene le Mire de Normandy.
1297. Theophilus Westhorp.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
July 14	3488	J. J. Welch and J. S. Margetson	Cheapside	Brace.
16	3489	W. Sharman	Melton Mowbray	Rake.
18	3490	G. R. Macnalley, P. Whitchurch, and G. R. Macnalley, junior	Camden-town	Flushing-pan closet.
19	3491	J. Cole	Holborn	Case and stand.
25	3492	Cowley and Madeley	Walsall	Tap.
,,	3493	J. Barlow	King William-street	Meat screen.
26	3494	J. Warner and Son	Jewin-crescent	Grinding part of taps.
,,	3495	J. Coxeter	Grafton-street	Scarificator.
28	3496	J. Purdy and J. Young	Commercial-road East	Carriage handle.
,,	3497	Capt. Collinridge	Brompton	Cygnet Hook.

WEEKLY LIST OF PROVISIONAL REGISTRATIONS.

July 21	523	W. Peplow	Stafford	Boot or shoe.
,,	524	W. Redgrave	Rickmansworth	Swimming armlet.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1565.] SATURDAY, AUGUST 6, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

SEARS' PATENT DIVING-BELL.

Fig. 2.

Fig. 1.

SEARS' PATENT DIVING-BELL.

(Patent dated January 29, 1852.)

The arrangements described in this specification are the invention of Mr. H. B. Sears, of New York, and patented in this country on his behalf in the name of Mr. Brooman. By their use the diving-bell will be rendered more easily manageable in any service in which it may be employed; and hydraulic constructions, in particular, will admit of being considerably facilitated through its instrumentality, while the increased power of supplying air for the sustentation of life and energy, peculiarly adapts it for use in explorations under water likely to exceed the usual duration of descents.

The principal novelties introduced into diving-bell apparatus by this patent, are; first, a new manner of supplying the air and water for effecting buoyancy and sustaining life; and, secondly, a means of maintaining an equilibrium of pressure within and without the bell, so that very light, and comparatively weak materials, may be employed in the construction of the apparatus. As the workman will have full power of adjusting with ease the specific gravity of the diving-chamber, he may rise or descend, or continue in a state of indifferent flotation, at will, without any aid derived from without.

The construction and operation of the apparatus, as represented in figs. 1 and 2 of the accompanying figures, is as follows:—The figure of the diving-chamber A is made up of the frusta of two cones joined at their bases. At the top is an opening by which the workman enters, and having a cover fitting air-tight, which may be secured from within, as shown at *a*, fig. 2. The bottom also has a hole in it, with a cover, as seen at *b*. Around the edge is a rim, a portion of which is seen at *c*, the remainder being broken away to allow of the representation of other parts. The use of this rim is to retain within the vessel any object the explorers may take in through the bottom. At *d* are a series of tanks arranged around the sides of the diving-chamber; these are the air and water reservoirs for regulating the specific gravity of the chamber. Each tank is connected with the others by two sets of pipes; the one set, *e*, being at the top, and the other, *f*, at the bottom. The upper pipe is for the supply of air, and the lower one for water. The supply of air is obtained from a reservoir (carried upon a boat or float) by means of a flexible tube extending from it to the diving-chamber, as seen in fig. 1, where B is the reservoir, and it is by filling the tanks *d* with air or water, wholly or partially, that the buoyancy of the chamber A is regulated; *g* is the end of a pipe to which the flexible air-tube, leading from the reservoir B, is connected outside, while it communicates within by means of a branch having a stop-cock *d'* with one of the tanks *d*, and then the main-pipe passes down near the bottom, and discharges by another stop-cock into the general chamber A; there is also another discharge into A from a cock near the top at *g'*. At *h* is a pipe for discharging air from the tanks *d*. This pipe has a stop-cock in it, and is besides covered by a valve of common construction on the outside, and opening outwards. At *i* is a pipe for emptying the tanks of water, which discharges outside, and also through the bottom; there being here a valve of common construction opening outwards. The air may likewise be introduced into and discharged from the tanks by separate pipes; an arrangement which will sometimes be required, as the proper balancing of the vessel will depend upon it. The chamber is further supplied with an arrangement for anchoring it to the bottom for holding it in one place, or to afford the means of shifting its position. The anchor, which may be of common construction, is attached by a cable *k*, through a traversing sheave or block *k'*, and the end, after passing over *k'*, is taken in through a hole in the bottom, where it may be wound upon a windlass. The block *k'* is fixed to an endless chain passing over two rollers, one near the bottom, and the other near the middle of the diving-chamber A, as shown in fig. 1. The upper roller is fixed to a shaft which passes through the side of the chamber A, and terminates in a crank by which it can be turned round. This movement from within effects the traverse of the pulley *k'*, up and down, and so changes the angle or direction of the pull upon the anchor. The various positions which may thus be given to the block *k'*, afford a means of regulating the degree of force with which the chamber is held to the ground; for if the cable be adjusted to pull from the bottom of the chamber A, it will exert little force in keeping it upon the ground; and, on the contrary, if the block *k'* be raised, the anchor will act more effectually to hold the chamber upon the ground. At *l* is a propelling rudder. This is a common screw, fixed upon a shaft passing through into A, and having a crank to set it in rotation. The box supporting the shaft is formed on the principle of a ball and socket joint; thus any direction may be given to the shaft, so that by it the chamber A may be propelled within a certain arc in various directions, the anchor forming the centre about which the motion would take place. The flexible air-tube is exhibited at C. It is so constructed as to be capable of being coiled or uncoiled without

interrupting the passage of air; for this purpose it is combined with a hollow shafted reel, *m*. The end fixed upon the reel opens in the hollow shaft, one end of which is stopped, the opposite end entering the reservoir B, through a stuffing-box at *m'*, by which means the air may pass out of B through the shaft, thence through the tube coiled upon it, and be thence discharged into A, so that no more tube need be in the water than is sufficient to reach the diving-chamber. The air-reservoir, B, must be constructed of a material capable of sustaining a great degree of pressure.

The mode of operating with the apparatus will be as follows:—The diving-chamber, floating upon the surface of the water, is anchored so as to stand over the bed of the wreck or other object to be explored, or as nearly so as may be. The reservoir B is then charged by means of an air-pump with as much air as can be forced into it, and the flexible tube C is attached to A at *y*. The workmen enter with such tools as they require, and the top is shut down and fastened. The tanks *d*, at first, contain only air at the pressure of the atmosphere. The cock in *h* is then opened, and also a cock in *f*; the latter of which allows water to flow into the tanks, and forces the air out, which decreases the buoyancy of A so much that it sinks. As the chamber descends, the cock *g'* is opened so far as to allow a sufficient amount of air to be sent in from the reservoir B to sustain respiration, and also to counterbalance the pressure of the water outside, for the ascertaining of which proper gauges will be employed. The specific gravity of the vessel may be regulated for any depth of water it is to go, by properly proportioning the water and air in the tanks *d*, so that it may be held in suspension at any depth the operators may please. In this manner the upward and downward motions are effected, while the traversing motion along the bottom is obtained by means of the anchor and the rudder.

If the apparatus lie in a current, it can be worked along it by means of the cable *k* being wound or unwound within, while to go from side to side the propeller-rudder is worked. As soon as the chamber is over the proper spot, the cover to the hole *b* is taken off, when the water will be kept back by the pressure of the air from within, and the workmen can then begin their operations. Light is admitted within the vessel by the insertion of heavy plate glass, or bulls'-eyes, in the top and sides. The buoyancy of A should be such that on emptying the tanks of water and filling them with air, it will rise to the surface with the additional weight of such articles as may have been taken from the bottom. As soon as it is desired to rise to the surface, water is expelled from the tanks by the force of the air from the reservoir, B, which is then admitted in at the top at *d*, the water passing out by the bottom pipes, *f*, from which there is a communication with the outside, between the cocks, as shown in fig. 1, at *f'*.

In regard to the cables, although the employment of one only is described, yet the use of several is contemplated; these may lead to anchors placed at different angles; and thus by drawing upon them in the necessary directions, the diving-chamber may be easily directed. It is intended to combine with the diving-chamber a second chamber, placed below the lower opening, and to be formed of several pieces, which is intended to act as a moveable coffer-dam. A plane of such an arrangement is seen in fig. 3, which shows the bottom opening of the diving-chamber. *n n* are two plates of metal capable of affording great resistance to pressure, and placed parallel to each other. *o o* are end pieces abutting against flanges, thus forming a box open at the top and bottom. When the diving-chamber has this attachment, and operations are to be effected with it, the whole is sunk together, and the lower edges of the coffer-chamber are forced down into the sand at the bottom, either by the weight of the chamber, or by force otherwise applied. The interior space bounded by *n n*, *o o*, may now be excavated, and any structure formed within, as masonry, pipe, telegraph wire, &c. The diving-chamber is then raised, and the coffer-dam advanced to the next step, &c. In laying pipe or telegraphic wire, so as to be below the line of anchors in rivers, as soon as they are down at the bottom of the excavation, the ends, *o*, may be removed, and the sides allowed to fall in, and with them the sand will flow in, and fill up the trench.

INDUSTRIAL PROGRESS IN 1852.

(Translated from the *Moniteur Industriel* for the *Mechanics' Magazine*.

NEVER, since laws for the protection of industrial discovery first existed in France, that is to say, since 1791, have so many patents been taken out as during the last eighteen months. The consideration of this progress is not without interest; it is a branch of the economical movement of the country, and the number of patented discoveries may be regarded as a measure of the activity of spirit prevailing in the industrial arts. This number is diminished in periods of crisis, and increases as public

tranquillity becomes firmer, and national prosperity advances; for it is reasonable to suppose that persons would not busy themselves with the researches, or incur the expenses consequent on the application of a new idea, unless the state of affairs justified the expectation that the outlay might be repaid, and the just reward of enterprise duly reaped.

In 1846, the number of applications for patents was 2,930; and in 1847, 2,925. Last year the number was 3,352. Since January 1, 1853, there has been a progressive increase. The number of patents taken out during the half year just concluded is 1,982; in the corresponding half year of 1852 it was only 1,506. If the same proportional increase continues, as it is reasonable to anticipate, during the current half year, the number in 1853 will exceed 4,500.

As an illustration of the connection existing between the state of industrial discovery and the political condition of the country, we may refer to the statistics of patents in 1848. Instead of the 2,925 patents of 1847, we then find only 1,220; now of these, 327 belong to the two first months of the year, which would leave 893 for the ten other months; that is to say, at an average of 89 per month. Now the monthly average in 1847 was 243.

The statistics of each month of 1848 are still more significant. During the month of March, when the vague hope that accompanies change prevailed, and there had not yet been time for the "situation" to develop itself fully, 117 patents were taken out; in April only 57. In May, when the invasion of the National Assembly had destroyed the hope that its meeting had called to life, the industrial world fell into complete confusion, and only 47 patents were applied for. This number suffered further depression in July, from the effect of the unfortunate events that marked the latter days of June.

The number of applications gradually increased towards the end of the year with some trifling variations. They were 110 in October, and 130 in November. In December, notwithstanding the difficulties attending the solemn election that then took place, the number rose to 155, for the provisional state of affairs had ceased, and a guarantee of security presented itself for the future. Nevertheless, during that half year, the monthly average did not exceed 103, while in the corresponding six months of the succeeding year, 1849, it reached 180, and increased unintermittingly up to an average of 279, in 1852. The year 1849 showed a total result of 2,022 patents—that is to say, 802 more than in 1848. The number for 1850 was 2,339; for 1851, 2,530; and finally, we come to the prodigious increase of the previous and the current year. But the inquiry into the *number* of annual discoveries does not offer sufficient grounds for ascertaining the nature and bearing of this movement in its relation to the industrial genius of the country, although the statistics of patents, considered from this point of view, furnishes matter of useful inquiry.

By classifying patents among the different branches of national industry, we may judge of the respective activity of each, and if we pursue this classification with reference to the different parts of the country, we should ascertain the proportion due to each department of the empire, and in what localities the spirit of enterprise acts with the greatest amount of energy on individual aptitude and will. The field of such inquiry is new, especially in its more fruitful portion; viz., the classification of discovery among the various branches of industry. The division of patents among our departments may be easily effected by examining page by page the official catalogues, which are prepared with great care; but the analytical classification is an extremely delicate task, the singularities, and, we may say, the whims of the spirit of invention, giving rise at times to questions very difficult of solution. Unless the heads of subdivisions were almost indefinitely increased, and the whole advantage of a statistical synthesis thereby lost, we must proceed in our clasification by analogy. We divide patents into nine classes, adopting the system of the central jury of the Exhibition of Industry of 1849, which classified the agricultural and manufacturing productions of France under the following heads:—1. Agriculture; 2. Metals; 3. Machinery and tools; 4. Instruments of precision; 5. Textile Fabrics; 6. Chemical Arts; 7. Ceramic Arts; 8. Fine Arts; 9. Miscellaneous.

We have found it necessary to confine our researches within a particular space of time, and have selected the years 1851 and 1852, which offer fruitful fields for inquiry and are nearly proximate to the current year. The "Certificates of addition," supplemental to the principal patent, are reckoned in the sum total of the privileges acquired during this period, and appear also in the departmental or local classification, but as they relate to the same branch of industry as the patent to which they belong, they are not enumerated in the analytical classification (or division according to the various industrial heads).

On examining the local classification we are struck with the preponderating share belonging to the department of the "Seine."

This department alone claims, in 1815, 1,715 patents out of 2,530; and in 1853, 2,266 out of 3,352.

It may be said, by way of accounting for this numerical superiority, that provincial inventors who have come to Paris in order to perform experiments, or submit them to scientific examination, take out their patents at the prefecture of the "Seine" before returning home; or, it may be urged, that in certain of the *industries* of Paris, patents of invention are sought as a species of puffing, notwithstanding the efforts of the law to obviate this system. But, nevertheless, the principal cause of the eminent position occupied by the department of the Seine in the statistical list of patents is the energy of the inventive spirit pervading the numerous and varied manufactures of the capital.*

The classification of patents according to subjects, embraces 1,841 patents in 1851 (the *Certificats d'addition* being deducted), and 2,482 in 1852, — making together 4,323 patents. The first branch of this classification is "machinery," which comprises hydraulic apparatus, steam engines, railway rolling stock, marine-traction and mining machinery; spinning, weaving, and typographical machinery; tools of all descriptions, &c. To this section belong 1,395 patents in one single year; that is to say, more than one-fourth of the total number of inventions.

To the chemical arts, which occupy the second rank, belong 820 patents, subdivided amongst the various heads of dyeing, printing, and colouring, and bleaching, soaps, varnishes, waterproofing, sugar-refining, heating-apparatus, and edible substances. The continual progress of chemistry applied to the useful arts is here brilliantly exemplified.

The miscellaneous manufactures form a division almost as considerable but not so interesting. To this category 768 patents belong. It includes the manufactures known as *Industries Parisiennes*, such as toys, articles for travelling, hunting, and fishing; hats, artificial flowers, stays, umbrellas, brushes, gloves, stationery, &c. If patents are at any time instrumental as "puffs," it is especially in such branches of manufacture as these. Many patents, however, are for very ingenious combinations and real improvements. To this class also belong the leather and skin manufactures, and surgical instruments, which have procured for many Parisian houses an European reputation.

The class of Instruments of Precision claims 489 patents; this is not surprising when we consider that it includes the manufacture of chronometers, clocks and watches, of physical, optical, photographical, and musical instruments, of electro-telegraphic and lighting apparatus, and of arms. From these four principal divisions we come to those of less numerical importance. Metals which, from the character of the metallurgical art, admit of less numerous modifications than machinery, reckon nevertheless 285 patents. This section comprises not merely the extraction of ores and the normal manipulations of metals, but also the manufacture of steel, hardware, mineral, fuels, grindstone, bitumen, slates, lithographic stones, &c.

The fine arts, which, when applied to the useful arts, require, generally speaking, personal skill rather than perfection of manufacturing process, seldom admit of combinations likely to become subject-matter of patents; the arts of the goldsmith, the jeweller, the sculptor, the "tabletier," the cabinet-maker, and the engraver, comprised in this division, claim 195 patents.

Our great textile manufactures, the value of whose annual produce exceeds 2,000,000,000 of francs, and which increase the number of their factories with prodigious rapidity throughout our manufacturing districts, are not to be judged by the patents ranged under the textile fabric class. This branch of industry contributes extensively to the machinery and chemical arts classes. Only 170 patents belong to the textile fabric class, after dismissing from the enumeration such as are more properly ranged under the machinery and chemical categories, although connected with this branch of industry.

The "Agriculture" section reckons 116 patents: the Ceramic Arts 85. To the latter division belong the porcelain, glass, and pottery manufacture. The agriculture class comprehends implements of husbandry and certain agricultural products. The ceramic class does not allow of much diversity of production. With respect to agriculture it may be observed, that the essential material of that branch leaves little scope for the exercise of industrial inventive genius.

Among these discoveries there are doubtlessly to be found errors and illusions; there are hypothetical inventors who aim at mere chimeras. A patent by itself is no guarantee for the novelty or merit of an invention, because it is granted by the French government without preliminary examination and at the risk of the petitioner. But allowing for lost labours and hopes destined to be frustrated, the patent lists of 1851 and 1852 present a mass of important researches, useful experiments, and

* During the first six months of the present year (1853), out of 1,982 patents, 1,963 belonged to the department of the Seine.

real discoveries. Our Patent Law, although defective in certain points, nevertheless affords the inventor genuine guarantees. The wide fields of mechanical, chemical, and scientific-instrument manufactures have been ploughed by ingenious spirits and sturdy hands. The more attentively this movement of our age is watched, the more convincing is the proof that the inventive genius of our country, applied to the useful arts, has been at no time more untiring and more productive. France adds each day to the splendour of the crown that she has worn with such glory throughout every phase of her history. Under such auspices the universal industrial struggle of 1855 may be awaited with confidence.

Rudimentary Treatise on Masting, Mast-making, and Rigging of Ships. Also, Tables of Spars, Rigging, Blocks, Chain, Wire, and Hemp Ropes, &c., &c., relative to every class of Vessels. Together with an Appendix of Dimensions of Masts and Yards of the Royal Navy of Great Britain and Ireland. By ROBERT KIPPING, N.A., Author of the "Elements of Sailmaking," &c. Illustrated with numerous woodcuts. London: John Weale, 59, High Holborn. 1853-4.

Rudimentary Treatise on the Construction of Locks. Edited by CHARLES TOMLINSON. London: John Weale and Co. 1853.

The above are additions to Mr. Weale's "Series of Rudimentary Works," which has already so much commended itself to public notice and favour as to need no eulogy here. We may, however, say that the character of that series will suffer no detraction by the issue of these volumes, so far as their preparation by the publisher is concerned; our estimate of their scientific and literary merits must be gathered from what follows.

The first of them comprises six chapters on masts and spars, two on knotting and splicing ropes, one on blocks and tackles, five on the various processes of rigging, and an appendix consisting of tabular dimensions of masts, yards, &c., of the various classes of vessels in the service. The information given on each of these subjects will be found highly interesting and valuable, and the work will doubtless be welcomed by many.

Mr. Kipping's book, however, contains several defects, more or less grave, some of which really cannot be tolerated by us; for, as critics, we are bound to be no less the defenders than the counsellors of the public. It will be sufficient to give the following extracts, in order to establish the justice of our allegation:—"—— then the angles or edges are taken off straight to the lines on each side, and made cylindrical." "Main-trysail-gaffs are generally fitted in that manner, which works in the truss-hoop, having an eye to receive it." "—— they are let in flush on the under-side, and extend from the fore-stay-hoop to the outside of the cap, and therefore adds materially to the fastening of the cap, and preventing the under part of it from working loose." "Topsail yards are of a cylindrical form, tapering from the slings or given diameter towards the ends or yard-arms." "—— the distance between the slings and the yard-arms on each side is quartered, which are distinguished into the first, second, and third quarters, and yard-arms."

No admissible excuse can be pleaded for the insertion of such sentences as these in works on science, especially when such are intended chiefly for the young. The author plainly sets at nought geometrical principles, grammatical proprieties, and literary elegances, when he talks of *cylindrical angles, tapering cylinders, a manner which works in a truss-hoop*, &c., &c. It is not sufficient, in order to palliate all this, to write in the preface that the book "is humbly submitted, trusting that it will meet with indulgence for any faults that may be contained therein; as, with the needful application to his profession, the author has no leisure to cultivate a literary style." What right have we to cede indulgence to any man for undertaking a task which he knows he cannot properly perform? Unless Mr. Kipping first persuaded himself that Mr. Weale had access to no one more competent than he, we know not how he can conscientiously have undertaken it. Besides, the author might surely have found some person who knew that angles cannot be made cylindrical, and that a cylinder is generated by a straight line which moves parallel to a given straight line, and who was also blessed with time enough to cultivate the elements of English etymology, who would have cheerfully and voluntarily revised his book before it was committed to the permanence of print.

Nor can we altogether acquit Mr. Weale in this matter. It is due to his own honourable celebrity, acquired by many years of benevolent enterprise and skilful toil in

the interests of scientific literature, that he should not permit such writing as we have pointed out to appear with the recommendation of his name, and in a series of his own origination. We feel, however, tolerably sure that the issue of the work with these errors uncorrected is to be attributed to some omission on the part of the publisher, and that it cannot have occurred with his sanction.

Of the sixty-nine pages on "masting and mast-making," quite one-half, unfortunately, consists of Tables, some of which we think are of but little value. For example, in the second chapter four pages of them for determining the positions of the masts of various classes of ships are extracted from Mr. Fincham's treatise on "Masting of Ships and Mast-making." They are constructed in order to give the positions of the masts of vessels when their length on the load-water line is known, *and that only*. Now is it not patent to the least learned in naval architecture that other quantities than the length of a ship must be considered in disposing of her masts? Can any person need to be informed that vessels of the selfsame length require to be masted very differently, according to other conditions of dimension and form? Of what service, therefore, can such tables be, beyond that of filling up the pages of a book? And although this may be an object worth consideration, and doubtless was so to the compiler of the book from whence they are taken, we nevertheless would rather have seen them dispensed with in the present work, especially as Mr. Kipping himself knows how valueless such tables are, as he has taken pains to intimate at another part of the work.

We fear he has been misled by the unhappy example of Mr. Fincham's work before alluded to, and this perhaps may serve partially to excuse him; and yet it is difficult to pardon a man for imitating that which is sufficiently bad to serve as a warning. Be this as it may, however, there is unquestionably a painful resemblance between the two productions. The involved, tangled, ungrammatical sentences — the egregious mathematical solecisms—and the absolutely useless tables that exist in Mr. Fincham's work seem, in many cases, to reappear almost unaltered here; but, *happily, not in such profusion*. Indeed, if it be as we surmise, and Mr. Kipping has trusted more than was proper to his predecessor, we ought to be thankful that he has re-produced as few errors and other defects as he has. Still we urge the question, why has he revived any?

But let us not expend too much time and space upon censure. We are not disposed to deny, but, on the contrary, we find great pleasure in assuring our readers that there is *some* accurate and valuable information upon mast-making in the work before us. Practical men will find several facts that they require to know very clearly expressed, and stated with considerable detail. The chief defect of this part of the book, is, we think, the entire omission of the methods of forming the made-masts, such as are chiefly employed in Her Majesty's service. The author pleads the difficulty of preparing the necessary engravings, and the inutility of the subject to those employed in the merchant navy, as reasons for omitting these. However, we think that a few simple cuts would have been sufficient for a full exposition of the modes of combination adopted, and at the same time the information would have been valuable to many readers of the work. Certainly the bringing together, coaking, bolting, and hooping of the spindle, side-trees, fishes, and cheeks of a large man-of-war's mast is an operation well worthy the attention and study of all mast-makers.

The author might also have profitably referred to the merits of the various methods of forming the lower portions of the main-masts of screw-steamers when the shaft for working the propeller extends further forward than the main-step. It is becoming a habit with some to allow the shaft under these circumstances to pass through the mast, in which case there is great danger of seriously weakening it, and in some instances we have seen very defective combinations of the lower mast-pieces employed.

The second part of the book, upon the rigging of ships, will be found almost unobjectionable by those who have no weak prejudices in favour of English grammar; here Mr. Kipping seems perfectly at ease. The language is so free and unaffected, so prolific in genuine nautical technicalities, that every sailor will undoubtedly pronounce it "jolly." Too much praise cannot be given to the author by such persons for this part of his work, in which he has succeeded in detailing, with great minuteness, processes which none but a man of great experience could have mastered so thoroughly. We have, however, to correct an error which the author has introduced on the 89th page, in the following sentence:—"Thus two single blocks will afford the same purchase as a tackle having a double and a single block, and with much less friction." This is not true. The "purchases" afforded by two single blocks, and a tackle having a double and single block, are in the ratio of two to three. That is, if with two

single blocks a man could lift 2 cwts., then with a tackle having a double and a single block he could raise 3 cwts.; the time occupied in raising them through equal heights being, of course, in an inverse ratio. This supposes the friction to be the same in each case.

We have not spared the faults of the book; but we hope nevertheless that none will therefore be deterred from acquainting themselves with it, and with all the knowledge on the subjects discussed that may be pleasantly and advantageously gathered from it.

The second of these treatises is the result of the joint labours of Messrs. Hobbs, Dodd, and Tomlinson, and is interesting in many respects and for various reasons. In the first place, it presents a very well-prepared digest of all the information that can be obtained upon the chief points of interest belonging to and connected with lock manufactures. The importance of obtaining secure locks,—the characters of Grecian, Roman, and Egyptian locks, — puzzle, dial, warded, tumbler, branch, and American locks are all treated of at considerable length, with perfectly scientific precision, and in a style that Mr. Kipping would do well to cultivate when he can gain an hour or two for the purpose.

In the second place, the work presents a very noticeable example of the uses to which the principle of a plurality of authorship may be applied. It is amusing to observe how pleasantly the "tinsel clink of compliment" is sounded among the authors. Of course, by courtesy we suppose that each praises another, and not himself. For example, at the end of the first chapter, Mr. Hobbs, we will presume, writes, "Perhaps the best account of locks which we have, considering the limited space within which a great deal of information is given in a very clear style, is that contained in Mr. Tomlinson's *Cyclopædia of Useful Arts;*" and, accordingly, in the ninth chapter, Mr. Tomlinson is "*bound* to admit that Mr. Hobbs is a mechanician of great skill, and with a profound knowledge of the art of a locksmith." Very pleasant, gentlemen, very!

In the third place, the book affords a very fair specimen of the *cuteness* of the transatlantic locksmith. The seventh, ninth, and tenth chapters may be especially referred to in proof of this. We have frequently been struck with Mr. Hobbs' bold appropriations of British credulity and forbearance; but when we find that he has turned three chapters of a scientific work which forms one of a highly-popular series into an elaborate advertisement of himself and his achievements, we cannot help confessing that he has at last done the thing *slick*.

We are not disposed, however, to attach the same importance to Mr. Hobbs' performances in the department of lock-picking, as many seem willing to attribute to them. Were all London startled to-morrow by the announcement of some most daring and cleverly-effected burglary, we should not for a moment advise the arrest of that gentleman upon *à priori* grounds of suspicion. We think he has been rather wary in the acceptance of challenges, and somewhat disposed to try his abilities where accidental defects favourable to his success were either likely to be found, or known to exist. Certainly, cogent objections have very frequently been urged against his pretensions to success; and in the late case of Saxby's lock, we are surprised that he himself does not repudiate all credit after being informed, and that truly, as we can vouch, that the lock was roughly made merely to exhibit a principle, and with only the rude tools that a blacksmith's forge is furnished with.

In fact, we think much of the notoriety of Mr. Hobbs is due more to the *character* of his calling than to his achievements in it. Lock-picking, burglary, Newgate, have not yet quite lost the report of their old associations, and their vulgar interest to the ears of the masses. At any rate, when it is Mr. Hobbs *versus* the Council of the Society of Arts, and other talented British gentlemen, we demand at least that the pretensions of our American visitor shall be lifted above all just doubt and suspicion before we decide the case in his favour.

By all who can pardon the little defects which we have pointed out, the book will be found a clear, fair, and otherwise unexceptionable treatise; full of valuable matter, and containing, upon the whole, an admirable exposition of the principles and practice of lock-construction.

COCHRAN'S GOLD-QUARTZ CRUSHER AND PULVERIZER.

On Saturday last, July 30th, we attended the works of the "Colonial Gold-Mining Company," Rotherhithe, to witness the operation of this machine, lately introduced into this country from America, by the inventor. A number of gentlemen interested in mining and the reduction of metallic ores were present, and made ample inquiries concerning various details, which were of considerable importance, and af-

fected materially the merits of the invention. Their questions were answered, much to their satisfaction, by the inventor; and no objection of any character was shown to exist. The machine is composed of six metal spheres placed between two horizontal metal plates, which are grooved in circles round their centres, the sections of the grooves corresponding to sections of the spheres taken through their centres. The upper plate is heavily weighted, and driven round a vertical axis by a band from an engine. The quartz is passed down through a central aperture in the upper plate, and crushed between the spheres and the grooved surface of the lower plate, water being introduced during the operation for the purpose of carrying the fragments of the quartz round with it. The alternate spheres are made smaller than the others, in order to keep the three crushing spheres apart. From the simplicity of the machine, it is but little likely to become deranged; and if deranged, may be very easily readjusted. The inventor stated, that with an engine of twenty-horse power, two labourers, and one person to superintend, he could guarantee to crush 30 tons of quartz in a day of 12 hours; and that even much larger results than this may be expected, and are already obtained, by many of his machines now in operation in the State of Virginia, and other parts of America.

During our visit, Australian quartz, after having been reduced by hand to fragments containing about 60 or 70 square inches, was supplied to the machine, and rapidly delivered from it through a wire gauze of about 40 wires to an inch of length. We cannot but believe that the new machine will not only supersede many of the present methods of reducing ores, but will also be found to yield very profitable results from the reduction of quartz, which, not being rich in gold, is at present unworked, because of the costliness of the reducing processes. Mr. Cochran connects with his apparatus a process of amalgamation, patented by another American gentleman, by means of which he is enabled to pass the reduced quartz at once into the amalgamator, and so obtain the metal without further expense.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

John Gilbert, of 79, Wardour-street, and Samuel Nye, of the same place, Middlesex. *Improvements in apparatus for mincing meat and other substances.* Patent dated October 20, 1852. (No. 464.)

The apparatus described by the patentees consists of a fixed metal cylinder, having one of its ends provided with a series of curved or bent concentric knives or blades which are fixed therein when in use, but are capable of being removed for sharpening and other purposes. The other end of the cylinder is caused to revolve, and is supplied with a series of projections fixed to it in oblique directions, which projections force the meat and other substances against the curved knives, and then towards the centre, whence they are driven out through a suitable orifice or opening. The meat is fed in by a hopper at the upper part of the cylinder.

A modification of the preceding machine is also described, differing from it in form, but retaining the same peculiarity of action. The fixed cylinder is in this case made of an elongated form, and has two sets of cutters or knives projecting into it from opposite sides, where they are held fast in grooves by filling pieces. The inner end of the cylinder terminates in a contracted neck with an aperture, through which the meat is forced by means of studs projecting from an axis carried by the front or cover of the cylinder, and revolving with it when set in motion by means of a winch-handle; the studs on the revolving axis being arranged spirally in two sets, and working into the spaces between the cutters. The machine is furnished with a hopper, through which the meat, &c., is supplied.

Claim.—The mode of combining the parts herein explained.

Isaac Davies, of 119, High Holborn, Middlesex, optician. *Improvements in optical and mathematical instruments.* Patent dated January 26, 1853. (No. 195.)

This invention relates to a new application of a telescope or telescopes for determining distances; and also for registering the state and foretelling the changes of the atmosphere by the increase or decrease of the field of view, as exhibited by a prepared table.

Nicolas Franqisque Ador, of 16, Castle-street, Holborn, Middlesex. *Improvements in preparing plastic materials to be used in the manufacture of fired wares, and for other purposes.* Patent dated January 26, 1853. (No. 197.)

This invention consists in the preparation of paste or slip by dissolving silicate of soda, potash, or lithine in boiling water and mixing therewith crushed amianthus (asbestos) in sufficient quantity to give the necessary consistency. The slip or paste thus prepared is suitable for being used in various ways in the class of manufactures indicated in the title.

John Henry Johnson, of Lincoln's Inn-fields, Middlesex, gentleman. *Improvements in the method of lubricating machinery, and in the mechanism or apparatus employed therein.* (A communication.) Patent dated January 26, 1853. (No. 200.)

Claims.—1. The general arrangement and construction of lubricators for horizontal journals, as described.

2. The application and use of a revolving lubricating cylinder or drum, which is kept pressed against the surface of the journal to be lubricated by the combined action of the buoyancy of the fluid, and of a suitable counterpoise.

3. The application and use of counterpoises or weighted levers, for the purpose of preserving the contact between the lubricating cylinder and the surface lubricated.

4. The application and use of a floating indicator for showing the level of the lubricating material.

5. The application and use of a sloping channel formed in the bottom of the lubricating reservoir for passing off the waste or impure oil which sinks to the bottom.

James Combe, of Belfast, Ireland, machine maker. *Improvements in machinery for hackling or combing flax and other fibrous substances.* Patent dated January 26, 1853. (No. 201.)

The objects and nature of this invention may be very readily seen from the claims, which are the following:

1. The application to hackling machinery of reciprocating or rotating friction or buffing surfaces, for the purpose of straightening and softening the fibres of flax and other like substances, either prior or subsequently to their undergoing the process of hackling or combing.

2. Arranging the rows of hackle-pins at equal distances apart, and inserting between them stripper-rods.

3. Varying and adjusting the height or position of the guards or stripper-rods with regard to the points of the hackle-pins during the descent and ascent of the holders, for the purpose of producing a more gradual action on the fibres than has hitherto been attained.

4. The use of hackle-pins of different lengths in the same or in different rows in connection with guards or stripper-rods, regulated as described.

William Galloway, and John Galloway, both of Manchester, Lancaster, engineers. *Improvements in steam engines and boilers.* Patent dated January 27, 1853. (No. 208.)

Claims.—1. The constructing of boilers with two or more internal furnaces in combination with one common chamber, containing vertical or inclined water tubes, and with one or more series of vertical fire tubes, in such manner that the products of combustion from the furnaces may unite and pass through the chamber before entering the vertical fire tubes.

2. The construction of boilers, with two or more vertical furnaces, in combination with one common flame-chamber, and with two successive series of vertical fire tubes, in such manner that the products of combustion from the furnaces may unite and pass through the chamber before entering the vertical fire tubes.

3. The constructing of stops formed of fire-brick in the combustion-chamber of boilers, having two or more furnaces, so as more effectually to bring together and commingle the products of combustion from the different furnaces.

4. An apparatus for reducing and regulating the pressure of steam.

5. Expansion-gear or apparatus for working the expansion valves of a steam engine by means of a cam-driver by racks and pinions.

6. The construction of metallic packing for pistons, composed of two concentric rings, the outer edge of the outer ring, and the inner edge of the inner one being formed cylindrical, and the other edge of each, *i. e.* the meeting edges, being formed conically.

Casimir Noel, of Paris, France, and Holborn, London. *A new regulating bit.* Patent dated January 28, 1853. (No. 209.)

The complete specification of this patent was filed at the time of application.

The new bit patented by M. Noel has a mouthpiece formed with a slightly elevated cavity for the tongue, so as not to injure the palate of the animal. At the upper end of the cavity is a crescent, of which the ends are rounded off into knobs or balls, which, when the rein is pulled, slightly press and titillate the membrane that covers the roof of the mouth, whereby the beast is caused to drop its lower jaw, and is inclined to submit without resistance.

Robert Shaw, of Portlaw, Waterford, Ireland, cotton spinner. *Starting, stopping, and reversing steam engines.* Patent dated January 28, 1853. (No. 210.)

The patentee describes and claims a combination of apparatus comprising a bevilled cog-wheel, keyed on the driving-shaft, and a similar wheel attached permanently to the side of the eccentric; a third wheel, gearing into both of these, is fitted loosely upon a handle that is capable of a motion in a plane perpendicular to the axis of the shaft. When this handle is moved the loose wheel is, by means of the fixed wheel, made to revolve, and consequently the wheel upon the eccentric into which the loose wheel

gears, and therefore the eccentric itself are made to revolve also.

Other modifications of this arrangement are also described and claimed.

William Tranter, of Birmingham, Warwick, gun-maker. *Certain improvements in fire-arms.* Patent dated January 28, 1853. (No. 212.)

This invention relates; *firstly*, to revolving pistols, and consists in applying to each of them a double trigger, or pair of triggers, combined with a safety stop-spring, by means of which the piece is kept from being discharged until the spring is moved out of the way of the cock, which may be done simultaneously with the lifting of the cock and the turning of the chamber by drawing back the lifting trigger, or lifting portion of the trigger, with the second finger. The inventor also elongates the tube or socket into which the hinder end of the revolving chamber is inserted in order that the chamber may be screwed forward when required, so as to keep the fore end always tight within the frame.

The invention relates; *secondly*, to a modified application of the above trigger or triggers, to breech-loading guns, and to a mode of inserting loaded cartridges into the revolving-chambers of such arms, the cartridge to be used being made so as to have a percussion cap placed in the end opposite the ball, by which arrangement the necessity of removing its ordinary closed end may be obviated. Triggers of the same kind as the former are to be applied also to needle guns.

Lastly; the invention relates to a mode of manufacturing gun-barrels out of two or more spirals of iron, or of iron and steel wire plaited, or crossed round a mandril, the said spirals being afterwards heated and welded as ordinarily.

Louis Christian Koeffler, of Rochdale, Lancaster, bleacher and dyer. *Improvements in bleaching and dyeing.* Patent dated January 28, 1853. (No. 214.)

Claims.—1. The employment of two or more closed vessels connected together, so as to enable a fluid which has operated in one to be transferred to another.

2. The application of steam in closed vessels for operating upon goods while they are saturated with ley during the process of bleaching.

3. Performing two or more of the operations necessary for bleaching yarn in one vessel without removing it therefrom.

Joseph Scott, of Glasgow, Lanark, glass manufacturer. *Improvements in closing or stoppering bottles, jars, and other receptacles.* Patent dated January 28, 1853. (No. 215.)

Claims.—1. The application and use in bottles with internally-screwed necks of stoppers with an external screw to correspond, and with a ring of soft or elastic material let into a groove of the overhanging part of the head of the stopper, thereby securing an air-tight junction.

2. The mode of constructing shears or shaping apparatus for bottles with an engaging and disengaging screw spindle.

3. The application to bottle shears of a central or intermediate screw spindle for securing the interior of the neck at the time of moulding the exterior thereof; and also the mode of engaging or disengaging the same by opening or closing the shears.

4. The general construction of bottles and stoppers as described.

George Edmond Donisthorpe, and John Crofts, of Leeds, York. *Improvements in combing wool, hair, or other fibrous material.* Patent dated January 28, 1853. (No. 216.)

This invention relates to certain improvements in Lister and Donisthorpe's wool-combing-machines..

Claims.—1. Certain arrangements for causing the porter comb to work with its teeth downwards, and to descend into and take the wool or fibre from the nipping apparatus and carry it over the travelling combs, and deliver it on to those combs by a brush or otherwise.

2. A certain combination of apparatus for dispensing with the porter or carrying-comb and causing the wool or fibre to be delivered from the rotary comb or nipper, and placed in the teeth of travelling combs.

James Pope Kingston, of Lewisham-road, Kent. *Improvements in combining metals for the bearings and packings of machinery.* Patent dated January 28, 1853. (No. 217.)

Claim.—The combination of mercury with tin and copper in the manufacture of bearings and packings for machinery.

Thomas Symes Prideaux, of Garden-road, St. John's-wood, Middlesex, gentleman. *Improvements in the manufacture of iron.* Patent dated January 28, 1853. (No. 218.)

Claims.—1. Distilling coal in suitable retorts, as in the manufacture of gas for the purposes of illumination and conveying the products to reverberatory furnaces employed in the manufacture of iron, and burning the same with atmospheric air, using suitable storing vessels, as explained.

2. Preparing coke, used in the manufacture of iron, by employing lime-water mixed with common salt, or carbonate of soda, instead of simple water, in the process of cooling the heated coke.

John Scott Russell, of Great George-street, Westminster, Middlesex. *Improvements in constructing ships and vessels pro-*

pelled by screw or such like propellers. Patent dated January 28, 1853. (No. 219.)

Claims—1. A certain combination of the parts of the vessel whereby the rudder is made to work below the propeller shaft.

2. A combination and arrangement of the parts of the vessel and propeller, whereby the after end of the propeller-shaft is caused, when desired to assume an angular position with regard to the other part thereof, and to move between the two parts of a double dead-wood and of a double stern-post.

Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agent. *Improvements in cables.* (A communication.) Patent dated January 28, 1853. (No. 221.)

The improvements claimed under this patent consist in making chain cables elastic in themselves by the insertion therein, at suitable intervals, of swivel or other formed links, combined with bolsters of India-rubber, or other elastic material, not liable to injury from immersion in water.

Henry Avins, of Birmingham, Warwick, timber-merchant and sawyer, and George Tarplee, of Birmingham aforesaid, clerk of works. *A new or improved brick.* Patent dated January 29, 1853. (No. 222.)

Claim.—The making of bricks with hollows or openings situated vertically. (What is this but Beart's perforated brick?)

Harold Potter, of Darwen, Lancaster, carpet manufacturer. *Improvements in the mode or method of producing a certain colour or colours on woven or textile fabrics and yarns, and in the machinery or apparatus connected therewith.* Patent dated January 29, 1853. (No. 223.)

This invention relates to the process of Turkey-red dying, and consists chiefly in padding the fabric or yarn with a salt of manganese, and then saturating it with oil in an exhausted receiver.

John Standish, of Bolton, Lancaster, machine maker. *Improvements in machinery or apparatus used in the preparation of cotton, wool, flax, or other fibrous materials to be spun.* Patent dated January 29, 1853. (No. 224.)

These improvements are applicable to drawing frames.

Claims.—1. A reciprocating motion given to the guides, forks, or pegs, to relieve the slivers from snarls, lumps, or knots.

2. Spoons of a peculiar shape, and a stop motion between the guides and a back roller.

3. Other spoons of a peculiar shape, and a stop-motion between the delivery and receiving rollers, to prevent lap.

4. A stop motion between the can or coiler and receiving roller, to prevent an overflow of the sliver, and consequent danger to the machinery.

William Archer, of Hampton-court, Middlesex. *An improved mode or modes of preventing accidents by improved signals on railways, part of which improvements are applicable to blast furnaces.* Patent dated January 29, 1853. (No. 225.)

This invention consists chiefly in certain modifications and extensions of the apparatus patented by Mr. Archer in March 1852, and of which a description will be found in our Magazine, No. 1522.

Henry Moorhouse, of Denton, Lancaster, tailor. *Improvements in the mode or method of preparing cotton, wool, flax, and other fibrous materials, and in the machinery or apparatus employed therein.* Patent dated January 29, 1853. (No. 226.)

These improvements relate to can compressers, coilers, or plungers, and consist in laying the slivers in a can or vessel, and keeping them well pressed down, so as to prevent them overflowing. Instead of laying the slivers in coils round the inside of the can or vessel, as is at present done, the inventor lays them in straight horizontal layers, by means of an eccentric or traversing motion; and instead of the plunger, as at present used, he employs one or more conical or other shaped rollers to revolve at the bottom of the can on the slivers.

Claims.—1. The method of laying the sliver in a horizontal direction, and pressing it with one or more rollers.

2. A mode of using the plunger, so as to accommodate itself to the different heights of the sliver in the can.

Francis Whishaw, of 9, John-street, Adelphi, Middlesex, civil engineer. *An improved lock, or system of locks.* Patent dated January 29, 1853. (No. 229.)

The inventor claims a lock, or system of locks, fastened and unfastened, on making and breaking the electric circuit.

John Ryall Corry, and James Barrett Corry, of Queen's Camel, Somerset, leather-dressers. *A new and improved method of dressing lamb-skin leather, and cleaning the wool therefrom.* Patent dated January 29, 1853. (No. 230.)

The patentees describe and claim—

1. A process for tawing and dressing lamb-skins, the peculiarity of which is not distinctly stated. The novelty, however, appears to be in the use of saline and alkaline solutions to remove the wool, and in subsequent subjection to similar solutions with final neutralization of the saline and alkaline matters by sulphuric and muriatic acid.

2. A process for cleaning the wool thus removed by the employment of acid to neutralize the alkaline and limy matters

contained therein, with a subsequent washing.

Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agent. *Improvements in diving-bells and apparatus to be used in connection therewith.* (A communication.) Patent dated January 29, 1853. (No. 231.)

A full description of this apparatus forms the first article of our present Number.

Marcus Spring, of 25, Church-row, Hampstead, Middlesex. *Improvements in apparatus for separating gold from matter mixed or combined therewith.* (A communication.) Patent dated January 29, 1853. (No. 233.)

Claims.—1. The arrangement of a flume divided into separate compartments by a succession of perpendicular crosswise partitions, with connected openings between the lower end of the partitions and the bottom of the flume, allowing the one to be passed from one compartment to another on the surface of the quicksilver.

2. The application of downward acting agitators, so arranged and worked as to produce a downward centrifugal pressure upon the surface of the quicksilver, in connection with the necessary agitation for washing the one and moving it longitudinally in the flume.

3. The furnishing of the centripetal compartment with a horizontal revolving table, in combination with a discharging aperture, surrounded by a conical inclined plane at the centre.

4. The arrangement of the circular channels with openings so adjusted as to secure an irregular spiral passage to the aperture at the centre.

These arrangements are claimed for gold separators, whether the centrifugal and centripetal compartments be used in combination or either of them separately.

William Watson Hewitson, of Springfield Mount, Leeds, York. *Improvements in suspending or applying mariners' compasses in vessels built of iron or partly of iron.* Patent dated January 29, 1853. (No. 234.)

The patentee claims as his invention the fixing of the "mariners' compass" in such a position that it will be at or near a point which may be called the neutral axis of that portion of the ship, which is cut by a vertical line passing through the binnacle or compass, and at right angles to the keel. It is not proposed to alter the position of the compass with reference to the distance at which it is usually fixed from the stem and stern of the vessel, but when convenient it would be preferred to place it about midway between these two points, and at or near the centre of the mass of iron which would be cut by another line passing longitudinally and vertically through the ship.

Lewis Jennings, of Fludyer-street, Westminster, mechanical engineer. *An improved construction of lock.* Patent dated January 29, 1853. (No. 238.)

This lock is composed of a series of permutation plates, pierced with a central hole for the key, and arranged within a rotary cylinder or casing, furnished with a projection to receive the action of the key, and with recesses in the outer periphery to receive tumblers when all the plates have been brought to the proper point. The key is formed of a similar number of plates, each with a recess of a different length to act in succession on the permutation plates, and bring them round to receive the tumblers which are worked by one of the plates made cam-formed for the purpose. The case containing the permutation plates and tumblers is surrounded by a permanent flange or case recessed to receive the tumblers when held out by the plates, so as to prevent the rotatory cylinder turning when locked. This cylinder has combined with it an excentric fitted to a yoke in the bolt, for the purpose of throwing the bolt; the excentric being at the dead point when the bolt is thrown, so that any pressure applied to the bolt to force it in, will have no tendency to turn the excentric.

William Constable, of the Photographic Institution, Brighton. *Improvements in transmitting motive power to machinery, and in regulating the action of rotary machines.* Patent dated January 29, 1853. (No. 239.)

The invention secured under this patent is a modification of the compensating fly-wheel, a description of which will be found in Vol. lv. p. 150, of our Magazine. The claim is for the employment of springs between the oscillating fly-wheel and the working parts of the machinery connected with it; and the use of levers of varying powers of resistance, for the purpose of equalising any variable force that may remain uncorrected in the use of such springs.

William Edward Newton, of Chancery-lane, Middlesex, civil engineer. *Improvements in machinery for dressing cloth.* (A communication.) Patent dated January 29, 1853. (No. 240.)

Claim.—Hanging the cloth rollers of a gig-mill or other machine for dressing cloth in a revolving carriage, or its equivalent, by means of which the cloth rollers may be turned round, and the cloth run in a reversed direction through the machine, without the necessity of unwinding it from, and rewinding it upon, the cloth rollers as heretofore practised.

Jean Baptiste Lavanchy, of Tamige, Savoy, machinist. *Improvements in the construction of collapsible framework of wood or iron, which may be employed for forming portable bedsteads, houses, parts of houses, or bridges, or other similar structures which may occasionally be required to be removed from place to place with facility, economy, and dispatch.* Patent dated January 29, 1853. (No. 241.)

Claims. — 1. Constructing collapsible framework composed of a combination of levers or bars, so arranged that they are self-supporting.

2. The use and application of studs or pins, to the ends of such levers to act as stops, and render the framework more rigid, and prevent it giving way in the middle.

3. The use and application of grooved or slotted bars to which the levers are jointed, and in the slots or grooves of which certain of the joint-pins of the levers are made to work, whereby the rigidity, strength, and firmness of the structure are increased.

George Twigg and Arthur Lucus Silvester, of Birmingham, manufacturers. *Improvements in apparatus for cutting and affixing stamps and labels.* Patent dated January 29, 1853. (No. 242.)

The complete specification of this patent was lodged at the time of application. The apparatus is mainly applicable for attaching postage stamps to letters, but may also be used for affixing other stamps or labels.

The stamps are fed into the machine in strips, then cut off singly and received with the gummed side uppermost on a sliding piston. The letter or surface previously wetted by passing in contact with a damp roller, is then placed over the stamp, and the sliding piston raised by means of a lever handle, so as to bring the stamp in contact with it, the letter being raised at the same time against a pressure surface above, by which means the stamp is caused to adhere to the face of the letter.

The claim is for the general arrangement and combination of the various mechanical contrivances set forth.

David Stephens Brown, of 2, Alexandrian Lodge, Old Kent-road, Surrey, gentleman. *Improvements in barometers.* Patent dated January 29, 1853. (No. 243.)

This invention consists of contrivances, *first*, for shortening the tubes of barometers by means of weights or springs being made to act upon their cisterns; *secondly*, for rendering the sympesometer self-acting; *thirdly*, for increasing the ranges of barometers by using a tube of unequal bore, and two liquids of nearly equal specific gravities, differently coloured; *fourthly*, for registering the fluctuations of barometers; and, *lastly*, for substituting a "Table of Probabilities," for the words "Fair, Rain, Stormy," &c., which are now employed.

Thomas Knox, of Birmingham, Warwick, boot and shoe maker. *A new or improved rotatory heel for boots and shoes.* Patent dated January 31, 1853. (No. 244.)

The inventor describes and claims a method of fitting a heel-piece to a boot or shoe, the connection being made by means of two metallic rings, one of which turns upon the other.

Samuel Perkes, of 1, Walbrook, City, London, civil engineer. *Improvements in the mode of constructing certain works applicable to aqueducts, viaducts, railways, canals, rivers, docks, harbours, lighthouses, breakwaters, reservoirs, tunnels, sea-walls, embankments, submarine foundations, and other useful purposes.* Patent dated January 31, 1853. (No. 247.)

The principal features of this invention have been secured to the patentee under the Act for the protection of inventions of 1851, and were exhibited to the public in the Crystal Palace.

Richard Palmer, of Bideford, Devon, whitesmith. *An invention which may be used for cutting turnips, mangold wurtzel, carrots, and other roots, or for bruising them only, or reducing them to a pulp, and for mixing them with meal as may be required, and also for grinding or crushing apples for cyder.* Patent dated January 31, 1853. (No. 248.)

In the first machine described by the inventor the knives for cutting the roots into slices are placed in a horizontal plate of metal or wood of a circular form, and by the turning of a screw they can be raised or depressed so as to cut the slices to any given thickness, from an inch to a sixteenth of an inch, when they are set turning horizontally with the plate. The knives for cutting the slices into shreds are of a lancet form, and project perpendicularly through the plate. The bruiser is placed below, and receives the slices as they are cut. Above the bruiser is a bin containing meal, which is precipitated through an aperture when the bin is shaken. The machine is fixed in a wooden frame of about three feet square, with cross-pieces for it to work on.

The inventor does not specify his claims.

Walter Williams, jun., of West Bromwich, Stafford, iron master. *Improvements in machinery for cutting or shearing iron and other metals.* Patent dated January 31, 1853. (No. 250.)

The complete specification of this patent was filed at the time of application.

In Mr. Williams' machine motion is given to a shaft, and thence communicated by screw and toothed wheels to a double

throw crank, whereby an alternate or reciprocating motion is given to blades which slide in carriages, and a similar motion in a vertical direction is given to the cutters by means of slots made in them in the form of the letter S, the one rising as the other falls. The vertical position of these cutters is maintained by causing them to work in slides, formed on the one side by bands or straps, and on the other by allowing the end of the cutting jaw to project over the side of the standard. By this arrangement the strain at the cutting point is thrown from the jaw back on to a holster.

Claim.—The peculiar construction and application of the slots above mentioned, working with the parts in connection therewith, as levers in raising and lowering the shears, whereby an excess of power is gained, together with the general arrangement and combination of the remaining mechanical parts, for the purpose of cutting or shearing iron and other metals.

Louis Guillaume Perreaux, of Paris, France, engineer. *Improvements in machinery or apparatus for testing and ascertaining the strength of yarn, thread, wire, string or fabrics.* Patent dated January 31, 1853. (No. 251.)

This machine consists of a rectangular frame, the inner sides of which form guides whereon are placed two moveable crossheads, which carry the hooks or other contrivances to which the material to be tested is attached. One of these crossheads is worked by a screw shaft, which passes through a screw-box or female screw on the under side of the crosshead, and has a handle at one end, whereby the screw shaft may be turned and the crosshead drawn back, so as to stretch the material. The other crosshead is also moveable on the guides, but is held back by a strong double elliptical spring attached to it and to the fixed framing. This spring is connected with a dial on which the tension is registered.

Claims.—1. The general arrangement of machinery described, or any modification thereof, in which the strength of materials is ascertained by means of elliptical springs.

2. Preventing the shock occasioned by the sudden breaking of the material under operation from acting upon and deranging the mechanism, by causing the spring to act upon an arrangement of gearing whereby a fly-wheel, or other counteracting agent, may be set in motion in order to absorb or modify the power exerted by the spring when relieved from a state of tension.

Edwin Pugh, of Whitstable, Kent, draper. *Improvements in the means of ballasting ships or vessels, and in rendering them buoyant under certain circumstances.* Patent dated January 31, 1853. (No. 252.)

The object and character of this invention may be seen from the following claims of the inventor.

1. The employment of watertight vessels made to fit the internal form of the ship and placed in compartments, and secured by battens and other similar contrivances for the purpose of preventing such watertight vessels from moving or shifting.

2. Certain described arrangements, or mere modifications thereof, for securing the said vessels in their places; and, also, the construction of apparatus for filling the said vessels with water.

John Mason, of Rochdale, Lancaster, machine maker. *Improvements in looms for weaving.* Patent dated January 31, 1853. (No. 253.)

This inventor claims the application of ball and socket joints to the swords, cranks, and picking motions of looms.

Thomas Lightfoot, of Accrington, Lancaster. *Improvements in glazes for pottery or other similar materials.* Patent dated January 31, 1853. (No. 254.)

The inventor proposes to use compounds of silicic acid and an alkaline base or bases in the formation of glazes on pottery, such silicated alkali being in part or wholly used in lieu of borax.

Edmund Leach, of Rochdale, Lancaster, manufacturer. *Improvements in the mode or method of preparing and spinning cotton, wool, flax, and other fibrous substances, and in the machinery or apparatus employed therein.* Patent dated January 31, 1853. (No. 255.)

These improvements comprehend,

1. A process of oiling wool by machinery, applicable to the teazer, devil, or other preparing machine; 2, A variety of improvements in the scribbler and condenser carding engines, and an endless rolled carding or sliver machine; and, 3, Several modifications of the self-acting mule, tending to produce greater efficiency in that machine.

The claims (41 in number) embrace the details of the improvements generally stated above.

David Chalmers, of Manchester, Lancaster, manufacturer. *Improvements in looms.* Patent dated January 31, 1853. (No. 256.)

The improvements claimed under this patent consist,

1. In adapting the loom used for damask weaving to the production of tweed, on one or both sides of the cloth, by the introduction of tappet motions; 2, In an improved letting-off motion composed of a system of levers introduced between the motive-power shaft and the yarn beam; 3, In an improved

temple, composed of two grooved or serrated bars of metal, one above, and the other below the cloth, and clipping it between them; 4, In an improved weft motion consisting of two connected rods acting at either end of the reed, and in communication with the frog or spring-handle; 5, In an improved fly-reed, in which a loose or false back to the reed is caused to fly up and down at each motion of the lathe or slay; being down when the shuttle is passing, and up when the shuttle is in the box, and the reed ready to back up the weft; 6, In an improved compound shuttle-box, revolving horizontally on an axis on one or both ends of the lathe; and, 7, In a mode of obtaining patterns by a species of cards, or links connected with the shuttle-boxes.

ISRAEL P. MAGOON, of Vermont, United States. *A new and useful improvement in steam-boiler chimneys.* Patent dated January 31, 1853. (No. 257.)

Claims.—1. The combination of a steam-tight vessel with a deflector, heater, and chimney-pipe, so that the deflector shall form the bottom of the afore-mentioned vessel; and the smoke and exhaust steam shall heat the said vessel by impinging upon the deflector.

2. The improvement of throwing the waste steam directly into the heater, and there partially or wholly condensing it before it is passed into the tank of the tender.

FREDERICK LAWRENCE, of the City Iron-works, Pitfield-street, Middlesex, WILLIAM DAVISON, of Halstead, Essex, and ALFRED LAWRENCE, of the City Iron-works, aforesaid. *Improvements in engines to be worked by steam or other fluid.* Patent dated January 31, 1853. (No. 258.)

Claims.—1. The application of an epicycloidal cylinder for the purpose of producing a rotary motion in an axle or shaft.

2. The use of a crank in the interior of a cylinder of any form whatever, worked by the revolution of a piston within the said cylinder.

3. Certain guiding motions described, by which the ends of the piston in the interior of the cylinder are made to describe the curve to which the cylinder is formed.

4. Various tools for boring a true epicycloidal curve.

WILLIAM PIZZIE, of Albourn, Wilts. *A railway-carriage break.* Patent dated January 31, 1853. (No. 259.)

This is an arrangement in which breaks are brought simultaneously upon the wheels of all the carriages, by means of rods extending throughout the length of the train, and fitted after the manner of ordinary buffer-rods.

MARC LOUIS ADAM TARIN, of Mount-street, Grosvenor-square, Middlesex. *An improved dustpan.* Patent dated January 31, 1853. (No. 260.)

This dustpan, which will be found a very simple and useful domestic article, is formed with a bottom, which stands upon the surface to be swept, and with a sloping front, up which the dust is swept, and at the back of which a recess is formed to receive the dust. The back of the pan is vertical, and has a handle attached to it.

MARC LOUIS ADAM TARIN, of Mount-street, Grosvenor-square, Middlesex. *Improvements in reflectors for diffusing light.* Patent dated January 31, 1853. (No. 261.)

This invention consists in constructing reflectors of glass or other transparent or semi-transparent substances of variable thickness throughout, the inner surface of them being partly convex and partly concave, and the outer surface altogether convex, whereby a more uniform and extensive diffusion of light is expected to be obtained.

JAMES COMINS, of South Molton, Devon, agricultural implement maker. *A clod-crusher, land-presser, or pulverizer.* Patent dated January 31, 1852. (No. 262.)

Claim.—The combining together of two or more sets of rollers mounted upon two or more separate axles.

CHARLES CATTANACH, of Aberdeen, Scotland. *Certain apparatus for measuring the human figure, and transferring the said measurement to cloth.* Patent dated January 31, 1853. (No. 264.)

The inventor combines straps, or strips of steel with upright and cross sliding pieces, in such manner that they may be easily adjusted to such parts of the human figure as require to be measured for garments.

JOHN PINKERTON, of High-street, Borough, Surrey. *A new mode of applying and combining ornamented glass in the manufacture of useful and ornamental articles.* Patent dated January 31, 1853. (No. 265.)

The inventor describes and claims certain methods of combining ornamented glass with highly polished metal, the ornaments being upon the inner or under sides of the glass, and the metal being brought in contact with those sides. His methods sometimes are rather different; for example, to construct a pedestal for a lamp he takes a tube of glass, whose outer surface is ornamented, and within this places a metal tube, polished on its outer side. A second tube of glass is then passed over all, and connected to the former one. Articles formed in this way, having their ornamented surfaces enclosed, will retain the devices wrought upon them uninjured for very long periods.

CHARLES HADLEY, of Lower Hurst-street, Birmingham. *Improvements in the*

construction and formation of granite and stone pavements and surfaces for carriage and railways. Patent dated January 31, 1853. (No. 267.)

The "improvements in carriage-ways" consist in constructing them of separate blocks of granite or wood formed into solid plates or blocks of any suitable size, by fixing them in metal plates, frames, or boxes, the foundation being composed of gravel or concrete.

The "improvements in railways" consist in using similar blocks as sleepers, or for forming the permanent way, and also in certain new forms of rails or grooves used in connection therewith.

PROVISIONAL PROTECTIONS.

Dated June 18, 1853.

1485. Guy Hannington, of Holland-place, Denmark-street, Coldharbour-lane, Surrey. Improvements in producing railway and other tickets and cards.

1487. Jacques François Dupont de Bussac, of Upper Charlotte-street, Fitzroy-square, Middlesex, gentleman. An improved mode of making with iodine and its compounds, in combination with substances containing extractive principles, various elementary combinations. A communication.

Dated June 20, 1853.

1512. Joseph Skertchly, junior, of Kingsland, Middlesex, and Ansty, Leicester, engineer. Improvements in the application of baths to articles used for resting the human body.

Dated June 23, 1853.

1531. Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, London, and Rue de l'Echiquier, Paris. A new distilling apparatus. A communication.

Dated June 29, 1853.

1569. John Imray, of Bridge-road, Lambeth, Surrey, engineer. Improvements in obtaining motive power.

Dated July 4, 1853.

1596. François Mathieu de Amezaga, of Bordeaux, France, Captain in the Sardinian navy. A method of obtaining motive power, and certain machinery or apparatus employed therein.

Dated July 6, 1853.

1611. William Woods Cook, of Bolton, Lancaster, muslin manufacturer. Improvements in the manufacture of woven or textile fabrics.

Dated July 9, 1853.

1634. James Parkes and Samuel Hickling Parkes, of Birmingham, manufacturers and copartners. Improvements in the manufacture of certain drawing or mathematical instruments, also in packing or fitting the same in their cases, which said improvements in packing or fitting are also applicable to the packing or fitting of other articles.

Dated July 11, 1853.

1645. George Ager, of Witham, Essex, gentleman. An apparatus for holding and turning over the leaves of music or music-books.

1649. Henry Brougham Hopwood, of St. George-street East, Wellclose-square, Middlesex. Improvements in ships' ports or scuttles.

Dated July 12, 1853.

1653. William Levesley, of Sheffield, York. An improved method of making table-knife blades.

1655. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in the preparation of glycerine, and in its applications. A communication from Victor Courbarlay, of Paris, chemical engineer.

1657. Martin Samuelson, of Hull, York, engineer. Improvements in the manufacture of bricks and other articles from plastic materials.

1659. William Francis Snowden, of Weymouth, Dorset, mechanist. An improved mangle.

Dated July 13, 1853.

1661. Henry Montague Grover, of Hitcham Rectory, Buckingham, clerk. A new method of finding and indicating the measurements of the sines and cosines of the arcs of circles or other peripheries.

1663. Thomas Hill Bakewell, of Dishley, Leicestershire. Improvements in ventilating mines.

1664. William Williams, of Fetter-lane, London, patentee of electric telegraphs. Improvements in electric-telegraphic instruments.

1665. John Loude Tabberner, of Lorn-road, North Brixton, Surrey. Improvements in the manufacture of iron.

1666. Frederick Ransome, of Ipswich. Improvements in the manufacture of artificial stone, and similar wares.

1668. Alfred Fryer, of Manchester, Lancaster, sugar-refiner. Certain improvements in the construction of apparatus for reburning animal charcoal.

Dated July 14, 1853.

1669. William Needham, of Smallbury-green, Middlesex, manufacturer, and James Kite the younger, of Princes-street, Lambeth, Surrey, engineer. Improvements in machinery and apparatus for expressing liquid or moisture from substances.

1671. Augustino Carosio, of Genoa, now of Upper Montagu-street, Middlesex, doctor of medicine. A new or improved electro-magnetic apparatus which, with its products, is applicable to the production of motive power.

1673. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of Fleet-street, London, patent agent. Improvements in the manufacture of anvils. A communication.

1675. George Humphery, of Brighton, Sussex, engineer. Improvements in regulating the supply of water for water-closets.

1676. Robert Smith Bartleet, of Redditch. Improvements in the manufacture of sewing-machine needles.

1677. John Yule, of North Wellington-street, Glasgow. Improvements in rotatory engines.

1678. William Little, of the Strand, Middlesex. Improvements in the manufacture of lubricating matters.

1679. Benjamin Looker, junior, of Kingston-on-Thames, Surrey. Improvements in the manufacture of bricks.

Dated July 15, 1853.

1680. James Nasmyth, of Patricroft, near Manchester, Lancaster, engineer. Certain improvements in the machinery and apparatus employed in rolling plates and bars of iron and other metals.

1681. George Gowland, of South Castle-street, Liverpool, Lancaster, chronometer and nautical instrument-maker. Improvements in certain nautical and surveying instruments.

1682. Robert Gordon, of Heaton Norris, Lancaster, millwright and engineer. Improvements in

furnaces used with steam boilers for the purpose of consuming smoke and economizing fuel.

1683. Henri Joseph D'Huart, of Longwy, France. Certain improvements in the manufacture of pottery.

1685. Charles Liddell, of Abingdon-street, Westminster, Esq. Improvements in moving boats on canals and rivers.

1686. Henry Nathan of Birmingham, Warwick, jeweller, and Solomon Elsner, of Exeter, optician. An improvement in spectacle and reading-glasses and pebbles.

1687. Henry Bessemer, of Baxter-house, Old St. Pancras-road, Middlesex, engineer. Improvements in the process of refining and manufacturing sugar.

1688. Charles Goodyear, of Avenue-road, St. John's-wood, Middlesex. Improvements in spreading or applying India-rubber or compositions of India-rubber on fabrics.

1689. Henry Bessemer, of Baxter-house, Old St. Pancras-road, Middlesex, engineer. Improvements in the manufacture and treatment of bastard sugar and other low saccharine products such as are obtained from molasses and scums.

1690. Charles Goodyear, of Avenue-road, St. John's-wood, Middlesex. Improvements in the manufacture of brushes and substitutes for bristles.

1691. Henry Bessemer, of Baxter-house, Old St. Pancras road, Middlesex, engineer. Improvements in the manufacture and refining of sugar.

1692. Isaac Taylor, of Stanford Rivers, Essex, gentleman. Improvements in machinery for printing.

1693. Charles Goodyear, of Avenue-road, St. John's-wood, Middlesex. Improvements in the manufacture of pens, pencils, and instruments used when writing, marking, and drawing.

1694. Charles Goodyear, of Avenue-road, St. John's-wood, Middlesex. Improvements in preparing India-rubber.

1695. Charles Goodyear, of Avenue-road, St. John's-wood, Middlesex. Improvements in the manufacture of beds, seats, and other hollow flexible articles to contain air.

1696. Jean Baptiste Jelie, of Alost, Belgium, thread-manufacturer. Improved machinery for dressing or polishing thread.

Dated July 16, 1853.

1698. Edmund Reynolds Fayerman, of Shaftesbury-crescent, Middlesex, gentleman. A method of and instrument for keeping time in music.

1699. Henry Lamplough, of Gray's-inn-lane. Improvements in the preparation and manufacture of certain effervescing beverages.

1700. Jacques Rives, of Hotel Motay, Rue Motay, Paris. Improvements in trusses for the cure or alleviation of hernia.

1701. Benjamin Burrows, of Leicester, designer. Improvements in Jacquard apparatus.

1702. James Naylor, of Hulme, near Manchester, Lancaster, surveyor. Improvements in lamps.

1703. Samuel Colt, of Spring-gardens, Middlesex, gentleman. Improved machinery for boring metals. Partly a communication.

1704. Marie Gabriel Adrien Edouard le Coat de Kervéguen, of Paris, France, retired naval officer. An improved construction of wheel for motive power and propelling purposes.

1705. John Wallace Duncan, of Grove-end-road, St. John's-wood, Middlesex, gentleman. Improvements in adhesive soles and heels for boots and shoes, and in apparatus used for preparing and applying the same.

Dated July 18, 1853.

1706. Isaie Alexandre, of Bruxelles, now of Birmingham. Warwick, merchant. Improvements in metallic pens and penholders.

1707. William Boggett, of Saint Martin's-lane, Westminster, gentleman, and William Smith, of Margaret-street, Middlesex, engineer. Improvements in machines for cleaning and polishing knives.

1709. Thomas Wood, cotton-spinner, and George Wade, mechanic, both of Sowerby-bridge, York. Improvements in machinery or apparatus for opening, cleaning, carding, or otherwise preparing cotton, or other fibrous materials to be spun.

Dated July 19, 1853.

1712. Peter Armand le Comte de Fontainemoreau, of South-street, Finsbury, London, and Rue de l'Exchiquier, Paris. A new mode of fastening buttons to garments, and an improved button, and also in machinery for manufacturing the same. A communication.

1713. Richard Dart, of the firm of Dart and Son, of Bedford-street, Covent-garden, Middlesex, carriage lace manufacturer, and Edward Silverwood, weaver. The adaptation of loom machinery to the purposes of embroidery for badges worn by the police, railway officials, and other officers, and which require a succession of figures.

1714. Charles Breese, of Birmingham, Warwick, japanner. A method of forming designs and patterns upon papier maché, japanned iron, glass, metal, and other surfaces.

Dated July 20, 1853.

1715. John Robison, of Coleman-street, London, silk-throwster. A new or improved apparatus for making tea and coffee and other infusions or decoctions for chemical and other purposes.

1717. Edwin Dalton Smith, of Hertford-street, May Fair, Middlesex. Improvements in crushing and washing ores and earths.

1718. James Shield Norton and Henry Jules Borie, of Union Works, New Park-street, Southwark, engineers and iron-founders. Improvements in the manufacture of tiles and stairs from plastic materials.

1719. John Dent Goodman, of Birmingham, Warwick. Improvements in lanterns.

1720. Philippe Poirier de St. Charles, of Fulham, Middlesex, engineer. Improvements in stopping and starting vehicles.

1721. Alexander Cochran, of Kirton bleach-works, Renfrew, North Britain, bleacher. Improvements in finishing muslin and other fabrics.

1722. James Mills, of Lower Brook-street, Grosvenor-square, Middlesex, gentleman's servant. Improved machinery for propelling carriages.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," July 29th,* 1853.)

521. John Smith, William Henry Smith, and Alexander Williams. Certain improvements in metallic plates, and in producing devices or ornamental patterns thereon, and in the apparatus and machinery to be used for such purposes.

617. James Summers. Improvements in certain kinds of sails.

(*From the "London Gazette," August 2nd,* 1853.)

572. Charles Parker. Improvements in weaving.

594. Samuel Blackwell. An improved strap or band for connecting together certain parts of harness and saddlery, applicable also to other purposes where straps or bands are used.

595. Samuel Blackwell. Improvements in saddlery and harness.

652. William Malins. Certain improvements in the application of atmospheric propulsion upon railways.

688. William Whitaker Collins. Certain improvements in looms for weaving. A communication.

744. Luke Smith and Mathew Smith. Improvements in machinery for weaving and printing.

878. William Johnson. Improvements in the production of ornamental surfaces in glass, porcelain, metals, and similar materials. A communication.

927. Isaac Simpson. Improvements in machinery for covering wire, silk, cotton, linen, wool, or any other flexible material, with wire, plate, silk, cotton, linen, wool, or any other flexible material.

940. William Hale. New kinds of fire-arms.

979. Frederick John Wilson. An improved wheelbarrow.

1117. James Egleson Anderson Gwynne. Improvements in the treatment or manufacture of peat and other substances to be used as fuel.

1150. William Johnson. Improvements in machinery or apparatus for sewing. A communication.

1389. Anthony Bernhard Baron Von Rathen. Improvements in the mode of and in engines for applying motive power.

1487. Jacques François Dupont de Bussac. An improved mode of making with iodine and its compounds, in combination with substances containing extractive principles, various elementary combinations. A communication.

1512. Joseph Skertchly, Jun. Improvements in the application of baths to articles used for resting the human body.

1554. William Fairclough. Certain improvements in looms for weaving.

1578. George Sterry. An improved method of producing designs and patterns in wood.

1611. William Woods Cook. Improvements in the manufacture of woven or textile fabrics.

1615. Robert Anderson Rüst. An improvement in pianofortes.

1621. Alexander Angus Croll. Improvements in apparatus used in the manufacture of gas.

1630. Louis Brunier. Improvements in obtaining power by compressed air.

1631. Stephen Martin Saxby. Improvements in apparatus for lowering ships' boats, and for holding and letting go tackle.

1649. Henry Brougham Hopwood. Improvements in ships' ports or scuttles.

1659. William Francis Snowden. An improved mangle.

1660. Nesserwanjee Ardaseer. A method of driving shafting, so as to obtain two revolutions of a screw or other shaft to one revolution of a driving-shaft, or to obtain the converse result.

1671. Augustino Carosio. A new or improved electro-magnetic apparatus which, with its products, is applicable to the production of motive power.

1673. Richard Archibald Brooman. Improvements in the manufacture of anvils. A communication.

1676. Robert Smith Bartleet. Improvements in the manufacture of sewing-machine needles.

1677. John Yule. Improvements in rotatory engines.

1678. William Little. Improvements in the manufacture of lubricating matters.

1682. Robert Gordon. Improvements in furnaces used with steam-boilers for the purpose of consuming smoke and economizing fuel.

1687. Henry Bessemer. Improvements in the process of refining and manufacturing sugar.

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1690. Charles Goodyear. Improvements in the manufacture of brushes and substitutes for bristles.

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1694. Charles Goodyear. Improvements in preparing India-rubber.

1695. Charles Goodyear. Improvements in the manufacture of beds, seats, and other hollow flexible articles to contain air.

1700. Jacques Rives. Improvements in trusses for the cure or alleviation of hernia.

1701. Benjamin Burrows. Improvements in Jacquard apparatus.

1703. Samuel Colt. Improved machinery for boring metals. Partly a communication.

1718. James Shield Norton and Henry Jules Borie. Improvements in the manufacture of tiles and stairs from plastic materials.

1719. John Dent Goodman. Improvements in lanterns. A communication.

1721. Alexander Cochran. Improvements in finishing muslin and other fabrics.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed July 28, 1853.

1853:

214. Louis Christian Koeffler.

221. Richard Archibald Brooman.

Sealed July 29, 1853.

222. Henry Avins and George Tarplee.

224. John Standish.

230. John Ryall Corry and James Barrett Corry.

241. Jean Baptiste Levanchy.

287. Ismael Isaac Abadie and Henri Laurel.

331. William Scott, Robert Brough, James Rinoe, and Thos. Mann.

746. Samuel Newton.

935. William Fawcett and Francis Best Fawcett.

1059. Edwin Heywood.

1080. Frederick Arnold.

1218. Samuel Eccles and James Eccles.

1280. James Lovell.

1317. François Francillon.

1338. William Edward Newton.

1339. Joseph Morris.

Sealed July 30, 1853.

244. Thomas Knox.
247. Samuel Perkes.
248. Richard Palmer.
259. William Pizzie.
260. Marc Louis Adam Tarin.
261. Marc Louis Adam Tarin.
262. James Comins.
264. Charles Cattanach.
265. John Pinkerton.
267. Charles Hadley.
269. Eliezer Edwards.
1119. George William Jacob.

Sealed August 2, 1853.

281. Auguste Edouard Bellford.
295. John Bower.
317. Thomas Peacock.
334. Richard Archibald Brooman.
338. Thomas Allan.
339. Thomas Allan.
345. William Birkett.
408. Charles Sheppard.
471. James Lawrence.
473. Francis Preston.
500. Martyn John Roberts.
1211. Moreton Hassall Phillips.
1331. John Champney Bothams.
1347. Admiral Earl of Dundonald.
1391. Christopher Nickels and James Hobson.

Sealed August 3, 1853.

290. Thomas Spiller and Anthony Crowhurst.
291. Manoah Bower.
292. John Heckethorn.
293. William Scarlett Wright.
294. George John Newbery.
297. John Henry Johnson.
306. George Winiwarter.

Sealed August 4, 1853.

318. William Walker.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1566.] SATURDAY, AUGUST 13, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

SEAWARD'S PATENT MARINE ENGINE.

Fig. 6.

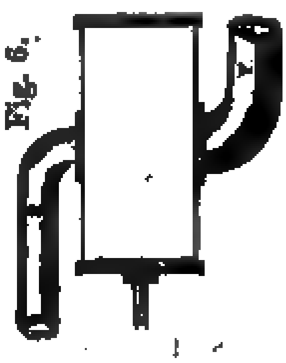


Fig. 5.

Fig. 4.

Fig

Fig. 2.

Fig. 7.

SEAWARD'S PATENT MARINE ENGINE.

(Patent dated February 9, 1853.)

The arrangement described under this patent is the invention of Mr. John Seaward, of the eminent firm of Messrs. Seaward and Co., of the Canal Ironworks, Poplar, and is applicable chiefly to engines employed for driving the screw-propeller. In engines of this description it has been heretofore the invariable practice to place the air-pump and condenser together in close conjunction; but as it is frequently the case that these parts of the engine are required to be situated at some distance from the cylinders, the consequence is that the spent steam has to be conveyed to the condenser by means of a pipe of considerable length—a disposition of parts which is not only highly inconvenient, but also prejudicial to the rapid condensation of the spent steam. Mr. Seaward proposes to remedy these inconveniences by disconnecting or separating the condenser entirely from the air-pump, which latter he places in any convenient situation where a ready connection with some moving part of the engine can be obtained to work the bucket, while he places the former in close contiguity to the cylinders, so that the spent steam may have the shortest possible distance to travel before being acted upon by the injection-water within the condenser; and he employs a pipe of convenient size to convey from the bottom of the condenser to the foot-valve of the air-pump the water arising from the condensation of the steam, together with the injection-water and the uncondensible air and gases which will be drawn up by the bucket, and discharged through the hot well in the usual way.

Fig. 1 of the accompanying engravings is a cross section, on the line A B of fig. 4, of a pair of engines for screw propelling, arranged according to Mr. Seaward's plan. Fig. 2 is a longitudinal section at the centre line between the two cylinders. Fig. 3 is an end view of the engine-framing, showing the main crank-shaft, with a section of the air-pump, &c., and fig. 4 is a plan view. In these figures only so much of the detail of the engines is introduced as is necessary to show the new arrangement. G′ G″ are the two steam cylinders, placed side by side in a horizontal position. H is the condenser, which, it will be observed, is placed partly between and partly upon the two cylinders, and has two inlet passages, I′ and I″, to admit the spent steam from the slide-chests, K′ K″. J′ J″ are the slide-valves, and L′ L″ the steam pipes; M is the air-pump, with its bucket, *m*, which is worked by a short crank placed on the end of the main shaft. N is the foot-valve; *n* the head-valve in the hot well, O; and P the overflow or discharge pipe. R is the pipe from the bottom of the condenser to the foot-valve, N, of the air-pump. The water from the condenser will be drawn up by the bucket, *m*, and discharged through the hot well, O, in the usual way. In this case the air-pump is one of the ordinary form employed with screw propeller engines, but any other suitable form of air-pump may be used. Fig. 5 is a longitudinal section, and fig. 6 a plan of a horizontal double-acting air-pump, which may be employed with advantage. S is the working barrel of the pump, with its bucket, T; V′ V″ are the two foot-valves, and W′ W″ the two head or delivery-valves, which discharge into the hot well, X. Y is the overflow-pipe of the hot well, and Z the pipe which conveys the water and uncondensed gases from the bottom of the condensers to the foot-valves, V′ and V″, of the air-pump.

The condenser employed with the arrangements before described may be of any approved construction, and placed otherwise than is shown in the figures, provided always it is in close proximity to the cylinders.

THE DUBLIN EXHIBITION.—SECTION OF MECHANICS AND MACHINERY.

We continue from No. 1563, the account of the Mechanical Section of the Dublin Exhibition, which we quote from the *Civil Engineer and Architects' Journal.*

The collection of clocks and watches, also arranged in the extreme southern gallery, is nearly all contributed by Dublin makers. There are not many exhibited, and, with one exception, none that present any novelty of arrangement, though as specimens of workmanship they are very creditable. A turret-clock, by Mr. Chancellor, of Dublin,

has an escapement which seems to be quite new. The novelty of the arrangement is conspicuous, in the first place, by the direction of the vibrations of the pendulum being at right angles to the face of the clock, instead of in the same plane as usual. There are two escape-wheels fixed on the same arbor, and consequently two palettes, also on one arbor, which are balanced on each side so as to move either way by the least impulse. The effect of this arrangement is to produce a perfectly dead beat, for the teeth of the escape-wheels strike against the palettes alternately, being directly checked and liberated by each vibration of the pendulum, which at the same time receives an equally regulated impulse, more free from the irregularities of the mechanism than by ordinary arrangements. In Mr. Chancellor's clock the bob of the pendulum weighs 82 lbs., and it is impelled by a weight of only 15 lbs. This particularity of adjustment in a turret-clock, seems, however, to be in a great degree labour in vain, for if the hands be exposed to the action of the wind, its force must produce greater variation in the clock movement than any ordinary irregularity in the mechanism. An electric clock like that of Mr. Shepherd's, in which the hands are independent of the mechanism, seems to be the only means of attaining accuracy with exposure to the wind.

The philosophical instruments in the Exhibition are principally of the educational kind, and present scarcely anything worth notice. Some rough models by Dr. Lover, of Dublin, show a mode of making and breaking voltaic contact at regular intervals by means of a miniature Barker's mill; also an arrangement for an electro-magnetic engine, in which the limited sphere of attraction of an electro-magnet is attempted to be compensated by a series of compound-levers acting inversely. Neither of these inventions, however, promises to accomplish the desired object. The regularity of the action of the first would be impaired by the friction at the points of contact, and the attractive force of the electro-magnet would be so greatly diminished by extending its range that comparatively little available power would be exerted on the crank. There are numerous daguerreotype and other photographic representations, among which are the well-known ones of M. Claudet, who also exhibits a large collection of stereoscopes with wonderfully solid-looking objects, that appear to project far from the surface of the plates. The Irish artists in photography do not seem to have attained much proficiency, with the exception of Professor Gluhman, who exhibits remarkably well executed daguerreotypes that present some of the finest specimens of the art. The electric telegraph has few representatives, and these are scattered far apart. The Electric Telegraph Company have a few needle instruments placed near the entrance of the central hall, which are kept in work; the Electric Telegraph Company of Ireland, who have adopted Mr. Dering's invention, have three needle instruments in the south gallery; some clumsy needle telegraphs are shown by Dublin makers, and there is a specimen of Mr. Bakewell's copying telegraph, showing the writing transmitted and the tin-foil original. The Magneto-electric Telegraph Company, who have recently succeeded in sinking a cable of wires from Port Patrick to Donaghadee, have not sent any of their instruments to the Exhibition, though they have extensive offices in Dublin, and have made considerable progress in extending telegraphic communication throughout Ireland.

The most interesting features of the Dublin Exhibition, to those who view it principally with reference to the development of the resources of Ireland, are the displays of its mineral treasures, and of those specimens of manufacturing industry by which the natural products of the country are wrought into objects of general utility.

Fine specimens of copper and of lead show the richness of the ores which constitute the most valuable of the metalliferous products of the country. The lead ores in the county of Dublin are rich in silver, and a mass of that precious metal, weighing 1,600 ounces, which was extracted from the lead ore of the Ballycorus mine, is shown as a tempting bait to English capitalists to engage in Irish mining adventures. The Royal Dublin Society, under whose sanction the Exhibition has been established, have contributed a fine collection of the marbles of Ireland, most of which are highly polished, and are worked into tables, chimney-pieces, and ornamental pillars. The beautiful green marbles of Connemara rival those from any part of Europe, and almost every county of Ireland contributes marbles of great variety bearing a high polish, which might be advantageously employed.

There are various other less ornamental, though more useful, mineral products, which may be regarded as the raw materials of extensive manufactures, and may become more important than the marble treasures in giving employment to the people. The slate quarries of Valentia, for example, in the county of Kerry, yield large thick slabs that can be easily worked, and are applied to many useful purposes; among which the construction of cisterns to hold water is per-

haps the most valuable. Grooves are cut round the slabs of slate after they have been ground smooth, into which the edges of the contiguous slabs fit, and by means of iron bolts and screw-nuts the sides are held firmly together, and can be made water-tight. No material for holding water can be purer than slate, and it is difficult to find any substance that answers the purpose so well. The lowness of price, also, is an important recommendation, for they cost considerably less than the poisonous lead cisterns generally used for domestic purposes. A cistern exhibited, which will hold 460 gallons, is marked £3 12s., on board, at Valentia, which is less than twopence for each gallon. The smaller sizes are, proportionally, somewhat higher. Baths, garden-seats, and numerous other articles, are made of the same material. Some of the slabs of thick slate exhibited are three yards and a half long, and nearly two yards wide. The Killaloe roofing slates, of which there are various specimens of large size, are stated to be superior to the Welsh in point of strength and durability, though heavier and coarser. The specimens of slate manufactures from Wicklow are of a more ornamental kind, and may serve in many instances the purposes of marble. This slate has a fine grain, and it is patterned with a coloured variety that gives it a remarkably beautiful surface when ground. Wash-hand stands, tables, and chimney-pieces are made of this slate, and though it does not appear to take a high polish, it looks very well when thus worked into articles of use and ornament, and its superior strength makes it preferable to marble.

The manufacture of drainage and water-pipes, roofing-tiles, and of other articles in the coarser kind of earthenware, is an object still more generally useful than the mere adaptations of slate, and from various parts of Ireland there are samples of these articles. From the Florence Court tile and pottery-works of the Earl of Enniskillen, from the Courtown tile-works in Wexford, from the Kinlough-works in Leitrim, and from the tilery in Tralee (of which Sir E. Denny is the proprietor), there are specimens that compete with those of similar

manufacture of drainage-pipes and tiles is the production of works in terra-cotta, the specimens of which are good, but they do not represent any extensive branch of industry, and many of the articles exhibited may be considered rather as representing finished specimens of what can be done than the actual state of manufacture.

In many parts of Ireland the decomposed feldspar of the numerous primitive rocks that have been lifted through the superincumbent strata affords excellent material for the formation of porcelain; and Mr. Kerr, of the Royal Porcelain-works, Worcester, being a native of Ireland, has taken great pains to work the Irish kaolin with the clay from Dorsetshire, and he has a large space allotted to him at the west end of the machinery-hall, where the manufacture of porcelain vessels and ornaments is exhibited, it being a great recommendation to Irish visitors that the natural produce of Ireland is used in the formation of the beautiful finished specimens exhibited in the gallery. One workman is employed in making delicate groups of flowers, in parian, for ladies' brooches; and visitors who wish to purchase may see them made in clay, and in the course of a fortnight they are sent to the kilns to be baked, and are returned in a finished state.

The discovery of a stratum of rock-salt on the estate of the Marquis of Downshire, at Carrickfergus, promises to become a valuable source for the exercise of mining and manufacturing industry. The rock-salt is interposed between strata of shales of considerable thickness, that incline upwards to the sea, and crop out a short distance from the land; but are covered with a horizontal bed of diluvial chalk and trap. The salt-pit having been sunk at some distance from the shore, the depth is nearly 700 feet before the salt-rock is arrived at. The salt so extracted is crystallised, though discoloured by mixture with other substances; it yields abundantly, and when purified looks very fine and white.

An exotic manufacture of Roman cement and plaster of Paris has been introduced recently into Ireland by Mr. J. Davis, of Dublin, who appeals to his countrymen for support, on the grounds that he will sell superior articles at English and Scotch prices—that he employs a number of hands that have never before been employed in similar work—and that by encouraging him and other Irish manufacturers, Ireland will become "great, glorious, and free," &c. Mr. Davis exhibits large and excellent-looking slabs of the compositions he thus strongly urges his countrymen to purchase; but as he has to import all the materials of the manufacture, including coal, from England and Scotland, it seems very questionable whether such a forced manufacture can stand its ground.

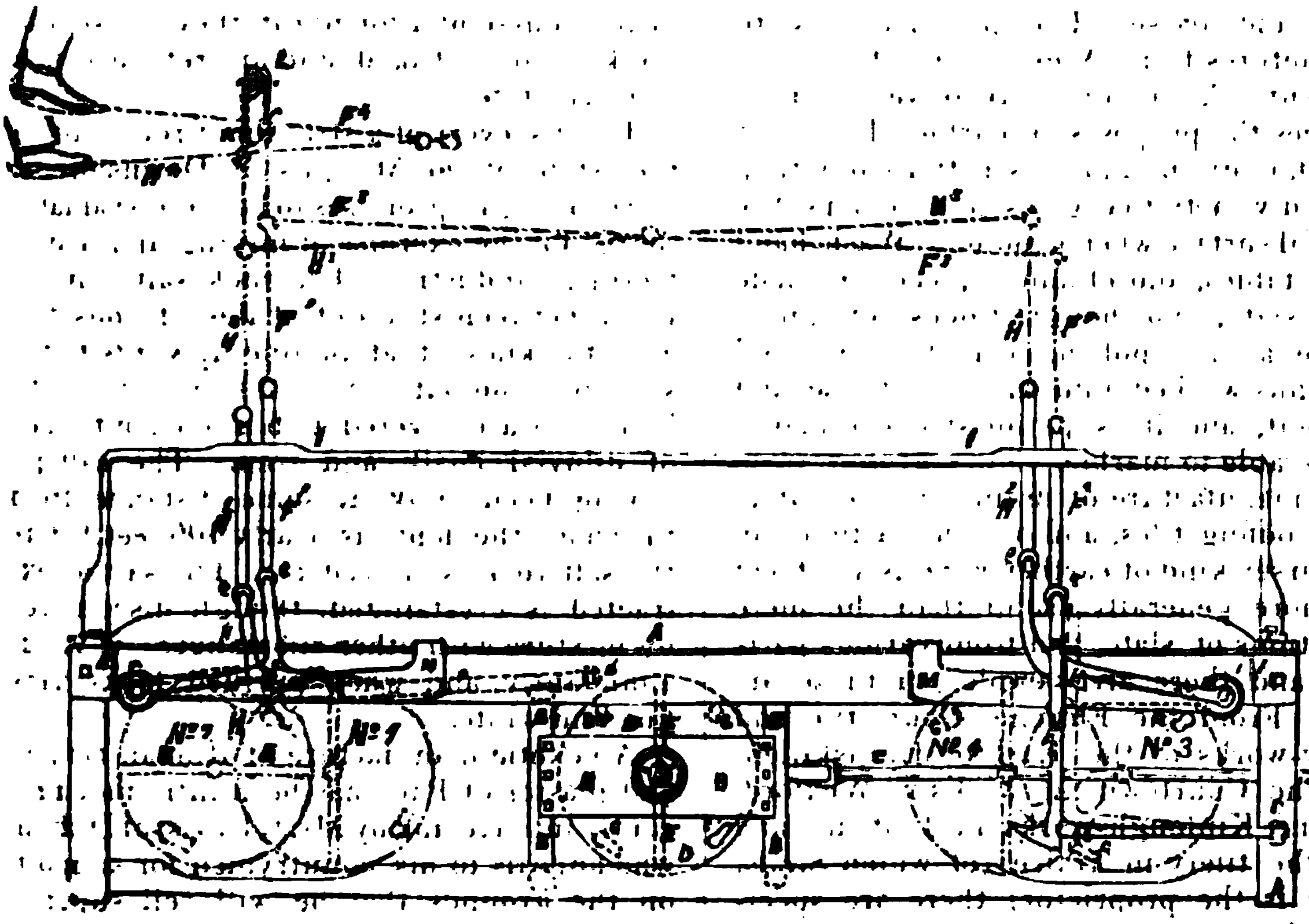
CARTER'S PATENT DIRECT-ACTION PROPELLER.

(Patent dated Oct. 14, 1852. See vol. lviii., p. 375.)

THIS is an ingenious adaptation of the principle of direct action in propelling, coupled with the capability of feathering the propelling blade during the reverse stroke, so as to reduce the resistance to a minimum.

Mr. Carter, it will be seen, depends for the efficiency of his propeller on a comparatively long stroke at a moderate speed, instead of a succession of short ones delivered rapidly, as in the paddle-wheel.

The engraving is a side elevation of the propeller detached from the vessel. A A is a rectangular open framing attached at the stern of the vessel, or any other part of it where it may be desired to apply the propeller. B B is a second frame, which is free to slide to and fro in the frame, A A. This frame, B, is attached by means of the connecting-rod, C, which is passed through a stuffing-box in the stern of the vessel, and afterwards by other connecting-rods and guides to the crank of the engine, by which the necessary reciprocating motion is imparted to the propeller. The frame, B, has a series of friction-rollers, shown in dotted lines, on the top and under side, on which the frame traverses in the guides, *a a*, of the frame-work, A A. D D are two circular plates or discs, one on each side of the frame. These discs are centred by means of the spindles, *b b* (which run on friction-rollers), in the frame, B. E is a float, which forms the propeller. This float is attached by stays or brackets to the discs, D D, and has the same reciprocating motion imparted to it with the frame, B. F F are catches, jointed at *c c* to the framework, A A; and G G¹ are studs fixed upon each of the discs, D. The object of the studs, G G¹, is to give to the float or propeller, E, its various positions when in work, as will be presently explained. H H are a second set of catches, which are also jointed to the framework, A, at *d d*, and serve when in action to reverse the propeller. F¹ F² and



H¹ H¹ are tail-pieces, each of which is connected to its respective catch, and serves to unite them to crossheads, *e e*, running across the top of the framework, A. These are connected in a similar manner to corresponding catches on the other side of the framing. F² H² are rods, which are jointed to the centre of the crossheads, *e e*, and are passed through the guide bar, I, and connected to the levers, F³ H³, as shown in fig. 1. The levers, F³ H³, are jointed by the rods, F³ H³, to the levers, F⁴ H⁴, which are capable of being worked by the feet of the steersman, who has thus the entire control over the action of the propeller, and can reverse the propeller or throw it entirely out of action, or stop the progress of the vessel, as circumstances may render expedient. The levers, F⁴ H⁴, are connected at *f* by the chain, K, passing over the pulley, L.

The action of the propeller is as follows;

—Supposing it is desired to propel the vessel forwards, the catches, F F, are placed in the position indicated in Fig. 1. Upon motion being communicated to the rod, C, the frame, B, and propeller, E, are caused to traverse along the guides, *a a*, in the frame, A. The position which the propeller assumes in its back stroke is vertical, as indicated by the dotted lines, which position it maintains until it arrives at the point indicated by the lines (No. 1), when the stud, G, comes in contact with the catch, F. The frame, B, still continues its back stroke until it arrives at the position indicated by the lines No. 2, when the catch, F, by means of the stud, G, causes the propeller to be feathered, or placed at right angles to its former position; the discs, D, being turned round one-quarter of a circle. The frame, B, is now caused to travel forwards, and the feathered position of the propeller is preserved until it arrives at the end of the return stroke, or to the point represented by the lines No. 3. The propeller then again commences its back stroke, when the stud, G^1, which fell into the position when the frame, B, arrived at No. 3, comes against the catch, F, where it is retained until the frame, B, traverses back to the position No. 4, during which time the propeller is being turned into its vertical position, so as to exert its full effective power on the water during the back stroke. The tail part of the stud serves, when turning from No. 3 to No. 4, to throw up the lever, F, and liberate the frame, B, when it traverses backward until it again arrives at the position No. 1, and the propeller is feathered as before. M M are bars pivoted to the frame, to keep the propeller in its proper place while it is being shifted from one position to the other. Instead of the bars being pivoted at the points represented in the figure, the patentee suggests that they may be turned the reverse way, and both pivoted upon the same pin in the centre of the framing, A. For reversing the action of the propeller in backing the vessel, the catches, F F, are thrown out of gear by the action of the foot-levers, which also throw the catches, H, into gear with the studs, G G^1, when precisely the opposite effect is produced, the propeller being thereby feathered in its back stroke, and in full action in its forward stroke. When it is desired to stop the action of the propeller, the catches, F and H, are all thrown out of gear, by which the levers, F^3 H^4, will be brought to a level in the same horizontal plane.

By thus placing the propeller under the control and command of the steersman, the engine need not be stopped or reversed, as is necessary with propellers of the ordinary construction, when it is desired to stop or reverse the progress of the vessel.

TRIAL OF A NEW SCREW PROPELLER.

It is averred that the screw propeller is still in its infancy, and that its advantages over the old paddle-wheel are, as yet, only partially developed. That such is the case seems to be evidenced by the number of new screws that are continually being brought before the notice of the public, each involving some separate scientific principle as a claim for improvement. Griffith's patent propeller has been acknowledged as the most approved form hitherto adopted; but it would seem that there is one that, on trial, has beaten even it. This latest screw is named the patent spiral propeller, and is the invention of Mr. Maxwell Scott, of Tranmere Foundry. The spiral propeller is formed on the principle of obtaining as much propelling surface on the outer edge of the blade as possible, at the same time allowing the greatest liberty near the centre, so as to offer the least resistance in the passage of the screw through the water. The propeller, in its appearance, is unlike anything we have seen before; and, without attempting a scientific description of its form, we may state that it has two blades, something resembling the blades of the old-fashioned screw, with a piece cut out of each, thus giving them the shape of an elbow, being diametrically opposed to Griffith's, where the outer edge has the least surface. Some time since an experiment was made with the spiral propeller on the screw steamer *Lucifer*, when the result was an increased speed of one and a half mile an hour over the ordinary screw, with a reduction of eleven revolutions per minute of the engines. The trustees of the late Duke of Bridgewater having kindly placed the screw-steamer *Weaver* at the disposal of the patentee, the spiral propeller was tried on her on Saturday, July 16th, with a still more satisfactory result. The *Weaver*, which was formerly fitted with Griffith's propeller, was quoted as one of the most convincing proofs of its great superiority over other screws; yet with the spiral screw, on Saturday, a greater speed was attained by the vessel, with a reduction of ten revolutions of the engines and forty revolutions of the screw, while there was a saving of one-sixth in fuel. It also possesses the advantage of doing away with all vibration, and making very little motion in the water, thus obviating the objection to the introduction of screw-steamers on canals. The *Weaver* was timed against the *Countess of Ellesmere*

on Saturday, during the two trips between Liverpool and Runcorn, and the difference was only twelve minutes in favour of the *Countess*.

From the considerable saving of fuel (proved on the several trials to be upwards of 16 per cent.) caused by the spiral propeller, it must prove an advantage to steamers on long voyages, by enabling them to obtain a much greater distance with the usual amount of fuel, and so lessening the necessity of frequent stoppages, besides the saving in wear and tear of machinery, caused by the decreased number of revolutions. We must not omit to add that, in the trials given above, the pitch and diameter of both Griffith's screw and Scott's propeller were similar.—*Liverpool Journal.*

GAS AND STEAM BOILER.

We have had submitted to us, by the inventor, Mr. H. M. Lefroy, R.N., a proposed plan of constructing a boiler and furnaces in which all the gaseous products of the combustion of the fuel will be discharged into the bottom of the boiler, and thence pass, rising through the water (in which all the impurities they may carry from the furnace will be deposited), saturated with steam, through the steam chest into the steam cylinders; the molecules of the gases serving as the conductors of the caloric into the water, instead of radiating it, as at present, through the plates and tubes of the boiler, into the same body.

The advantages attributed to this form of boiler and furnaces are,

1st. A great economy of fuel, resulting in two ways; namely, in an absolutely greater quantity of caloric being generated from a given quantity of fuel, and in the saving of that portion of it which at present passes up the funnel in combination with the gases, both in the latent and sensible form.

2ndly. A saving in the cost of the apparatus, due to a reduction of its weight and size, and to its increased durability. The size will be diminished from the smaller quantity of coal to be burnt, and from the greater rapidity of its combustion, which probably will vary with some power of the density of the supporter of combustion; and the durability will be much increased from no part whatever of the boiler being exposed to the direct action of the furnaces: and since probably nine-tenths of the whole elastic bodies which pass through the cylinders will be steam, condensation will still be applicable with advantage, on the condition of using a larger air-pump with the condenser than at present is necessary.

A careful analytical investigation, made by the author, and printed as an appendix to Mr. A. Gordon's tract on the Fumific Propeller, gives 2·630·767 lbs. raised one foot, as the measure of the elastic force of the gases into which 1 lb. anthracite coal is decomposed by combustion, after deducting the equivalent of the air pumped in to sustain that combustion, on the assumption that the whole caloric developed by the combustion is retained by the gases. Now although, as has been stated above, in the proposed system far the larger part of the caloric will be expended in the generation of steam, the gases simply conveying it into the water; still, since the volume of these gases is more than three times that of the air which is necessary to their generation under the same temperature and pressure, and all the caloric developed must be either retained by the gases or taken up by the water, in either case contributing to the total elastic force generated and utilized, a considerable increase of power over that now realized may confidently be expected.

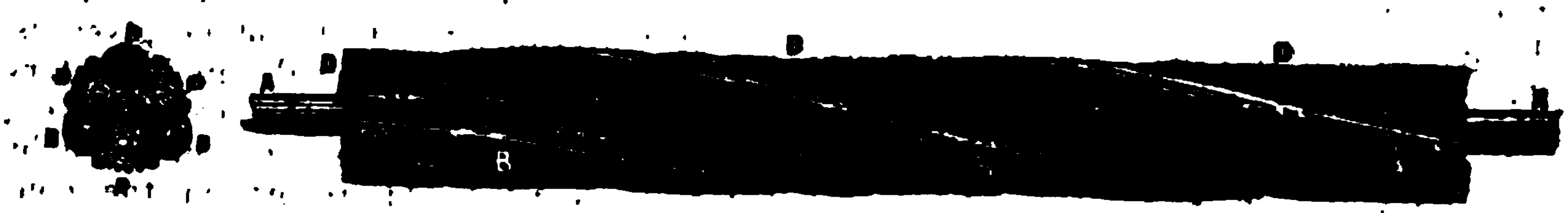
The stoke pipes of the furnaces are each intersected by a sliding water-filled door, communicating with the boiler by two small pipes working in stuffing-boxes. These doors will be so fitted to the chamber in which they slide, as to prevent the escape of any of the gases from the furnace into the air. In fact the greater the excess of the gaseous pressure in the furnace over that of the atmosphere without, the more tightly will the sliding door be jammed against the part of the boiler on which it rests. Each of the furnaces is capable of being stoked separately and independently of the others; and during this operation combustion in that furnace will be suspended by the supply of oxygen being cut off, whilst the other furnaces continue in full operation.

NEW SUBMARINE TELEGRAPH ROPE.

Any improvement that tends to economize and increase the security of a material so important among the media of electrical communication as the telegraph rope, is now necessarily of great scientific, and of still greater commercial interest, especially as the difficulties and mishaps that have occurred in the past limited uses of the submarine telegraph naturally make us anxious as to the contemplated extension of it to the purposes of correspondence between widely-separated continents. When lands sundered by oceans are to be connected, we may expect other difficulties to arise, and severer tests to be applied than were ever hitherto experienced; but however this may be, it is certain that every

real improvement should be carefully brought before the public.

In another column we publish, among our abstracts of specifications recently filed, the description of a new submarine telegraph rope, the invention of Mr. Thomas Allan, of Edinburgh. The principle upon which this rope is constructed is that of having an incompressible and inextensible core, by which arrangement all rending or crushing forces are prevented from acting upon the insulated wires, and the security of the rope is made very great. The accompanying engravings represent two ropes constructed on this principle; the first is of the simplest form, A being the core, B the spiral wires, and C the insulated conductors; the second has additional small protecting wires D twisted between the larger ones, for the purpose of defending the insulated conductors more effectually against external injury. This principle is the reverse of that on which the Dover and Calais rope is constructed, where the soft insulating medium forms the principal part of the core of the rope; and it is apparent that in this arrangement the conductors are very much more exposed to fracture than in the former.



Mr. Allan's rope will be cheaper and less weighty than others, and consequently much more fitted for laying down through longer distances; and it will be found that the insulating medium, and consequently the conductors, are considerably preserved from any damage that may seem likely to be produced (by rubbing against rocks or other substances) by so arranging the parts that the spiral iron wires would first touch and rub against the surfaces in contact with the rope. Of course a greater number of wires, and a corresponding increase of weight, would render it more secure in the event of its being caught and strained by an anchor; but even in its present form, it undoubtedly affords a much more effective resistance to any strain of that character than the rope in which the core is subjected to destruction and the conductors to fracture by a lateral strain upon it, while the iron of the rope remains uninjured.

We have seen several specimens of these ropes, and feel convinced, from their increased strength and their reduced weight and cost, of their great applicability to the intended telegraphs of great length before alluded to.

Mechanics' Institutions; what they are, and how they may be made, educationally and politically, more certain. By Alexander Kilgour, M.D. Smith and Elder.

The strong desire which prevails universally among the better classes of society, that Mechanics' Institutes, and others of an educational character professing to be organised on the self-supporting principle, should enjoy a high degree of prosperity, furnishes a sufficient inducement to examine their present condition, and to investigate the causes which have led to their inactivity and depression. These causes being indicated so far as experience can bring us acquainted with them, we shall then be able to alter their constitution with the best prospects of future success. The author of the pamphlet before us has bestowed a great deal of attention on the subject, which he appears to have inquired into with great devotedness, under the conviction that these institutions contain the germ of the next great direction of social improvement.

Their general failure, even when it might have been supposed that instruction in

elementary subjects, bearing on industrial employments, would induce the attendance and support of the working-classes, is illustrated by him in several remarkable examples, and attention is particularly drawn to the circumstance as accounting for the wide departure which has, in most instances, taken place from the original plan on which these institutions were founded. The introduction of amusements of various kinds is shown to have been occasioned by an attempt to render them popular among the working-classes, who had failed to be attracted by them in their original form. When this innovation had taken place, the history of mechanics' institutions did not acquire any permanently brighter aspect. With great numbers, undoubtedly, who naturally wished to obtain the largest amount of amusement and instruction for the smallest money, these amusements "took" amazingly. Concerts and other entertainments have flourished in many places, but it has been found difficult to maintain this freshness of attraction, while it is even doubtful that they are ultimately remunerative. Under these circumstances the principle which the author lays down for the Directors of mechanics' institutions to proceed upon is, that they should give sound, useful instruction, which he thinks, and probably with reason, cannot, to an extent worthy of the name, be acquired in combination with amusement. Of the several means by which this is to be done, he points to well-conducted classes, lectures, libraries, and reading-rooms. With regard to classes, we quote the opinion of the Secretary of the Yorkshire Union, in his Report for 1849, to the effect that those classes which have been the most successful in Yorkshire are those which are most identified with the wants of the working classes. On the subject of lectures he is the least favourable of any to that mode of inculcating knowledge in mechanics' institutions. He objects, that to be good they must be costly; and that in that case they are better adapted to the public generally, than to the attainment of the objects which most working men have in view. Libraries, next to classes, form the most valuable part of mechanics' institutions; and, in the author's opinion, cannot be made too extensive or too varied. "Reading-rooms," he observes, "also, especially when they take the form of news-rooms, generally succeed, and together with the library, often defray the whole expenses of the institution."

With these remarks on the relative merits of the several departments into which the operations of mechanics' institutions commonly subdivide themselves, the author comes to these two conclusions; first, that the working classes would not benefit by them to the extent that might be looked for; and, secondly, that they have never been self-supporting as regards the classes for which they were established. Unhappily, our own experience leads us to acknowledge the truth of these views; and fully acknowledging the difficulty, after so long trial, of putting them on a more prosperous footing, we heartily concur in the desire of many who are anxious to see some important step taken, were it only by way of experiment in a few cases.

The advantage of State-aid is the great point to which the author leads his reader; and though not complaining of the expenditure of public money on our universities and collegiate establishments, he asks why the education of the poor and labouring population does not at least receive some support. Government interference is in some respects prejudicial; but in the case of mechanics' institutes it would most probably be the means of introducing more systematic management than has as yet prevailed. The extent to which he proposes that Government aid should be given is, that it should be an annual supplementary grant, at least equal to the fees received; when one or two inspectors, appointed by Government, should report on the condition and management of such as applied for assistance, in cases where classes suitable to the mechanic were taught. The second proposition is, that there should be a staff of paid lecturers to visit the institutions in rotation. This would certainly be doing much towards reviving these institutions, probably as much as possibly could be done by direct assistance. Associated with this, however, there should be an encouragement of an indirect character, founded upon a system which in some degree should recognise, and open the way to promotion in the walks of industry, superiority in valuable studies pursued in these institutes. What may be effected through the instrumentality of the department of practical art, remains yet to be seen; but a system under which a distinction in the nature of a diploma for proficiency is to be obtained, appears to us certain to surmount the difficulty of obtaining attendance, and, in conjunction with State aid, to promise the complete success of mechanics' institutes in general.

Mr. Kilgour has exhibited the bearing of this subject in its political, social, and educational point of view; and his pamphlet will be read with great interest by all who have at any time concerned themselves in the prosperity of these praiseworthy undertakings.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

Eliezer Edwards, of Birmingham, Warwick, manufacturer. *A new or improved bedstead, which may be used as a vehicle.* Patent dated February 1, 1853. (No. 269.)

This invention consists of a bedstead formed with a wheel and handles, in such manner that it may be used as a wheelbarrow, or other like machine, for transporting goods.

Joshua Murgatroyd, of Heaton Norris, Lancaster, millwright and engineer. *Improvements in the construction of boilers, and apparatus connected therewith.* Patent dated February 1, 1853. (No. 272.)

The improvements claimed under this patent comprehend—

1. A method of constructing the fireboxes and combustion-chambers of boilers, and connecting them to the outer casings by means of plates or stays.

2. An apparatus for rarefying or drying steam, between the boiler and the engine, by the heat of the products of combustion in their passage from the tubes to the chimney.

3. An arrangement for regulating the heat in the flues or tubes more effectively than can be done by the ordinary dampers, by means of a flap-door, or doors, or a sliding door covering the ends of the tubes, or a portion only of them, and under control of the engineer from without.

John Cockerill, of Kingston-upon-Hull, grocer, and Thomas Barnett, of the same town, miller. *Improvements in the construction and use of coffee-roasters.* Patent dated February 1, 1853. (No. 273.)

Claims.—1. Any mode of roasting coffee by using radiated heat, in combination with the use of a roasting vessel composed of sheet iron or other metallic substance, such roasting vessel having one end of it exposed to the action of heat radiated from a fire—the said end being covered with wire-gauze or perforated metal plates, and the axis or centre of motion of such roasting vessel being at right angles, or nearly so, to the fire-bars, so that the perforated end of the vessel shall revolve in a plane parallel, or nearly parallel, to the fire-bars.

2. Partially surrounding the fireplace of coffee-roasters with boiler-plates placed at such distances apart as to leave water-spaces for the generation of steam, and applying the steam thus generated to a steam engine, for the purpose of communicating rotary motion to the vessels in which the coffee is placed during the process of roasting.

James Carter, of Oldham, Lancaster, painter. *An improved rotary engine.* Patent dated February 1, 1853. (No. 275.)

Mr. Carter describes and claims a rotary engine so constructed that the steam is applied to produce motive power in the same vessel in which it is generated, and previously to its ascending to the surface of the water. He employs a wheel similar in form to an ordinary overshot water-wheel; this is keyed on to the main shaft, and placed in a cylindrical or other suitably-formed vessel, so that the wheel is nearer to one side of the cylinder than to the other. The shaft passes out horizontally through steam-tight bearings at the ends of the vessel. The furnace is fixed at each end of the vessel, but under one side of the wheel, that is, upon one side of the axle only. The upper part of the vessel is connected by pipes with the condenser.

Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. *Improvements in block-printing.* (A communication.) Patent dated February 1, 1853. (No. 276.)

This invention relates chiefly to the manufacture of paper-hangings, and the object of it is to keep the blocks in contact with the paper as long as is necessary.

Claims.—1. Holding the printing-block in contact with the paper or stuff to be printed during a quarter revolution, or thereabouts, of the cam-shaft, while the necessary pressure is applied to transfer the colour to the material, without interrupting the continuity of the other movements of the machine.

2. A cam constructed and operating as described, for the purpose of prolonging the pressure of the block upon the paper.

3. Certain vertically-revolving sieves, in combination with a carriage and colour-rollers.

4. A combination of elements, by which an intermittent traversing motion is communicated to the carriage and colour-rollers.

5. A certain device employed for feeding the paper or stuff to be printed, and by which the register of the pattern is obtained.

Auguste Edouard Loradoux Bellford, Holborn, London. *Improvements in life-boats and vessels of a similar nature.* (A Communication.) Patent dated February 2, 1853. (No. 281.)

The patentee describes a vessel of which the portions above and below a horizontal section taken at half her height are exactly similar. The accommodation for the rowers and passengers is afforded by the midship portion of the vessel being left open down to a flat laid at the half depth of the vessel.

Claim.—A buoyant boat constructed with an opening, and having either a fixed or moveable floor and thwarts, whereby it is

made ready for service whichever of the two sides be uppermost.

AUGUSTE EDOUARD LORADOUX BELLFORD, of Holborn, London. *Improvements in furnaces and apparatus combined therewith for making wrought-iron directly from the ore, and for collecting and condensing the oxides or other substances evaporated in the process of deoxydizing iron or other ores.* (A Communication.) Patent dated February 2, 1853. (No. 283.)

The principal feature of this invention will be seen from the following claim, viz., deoxydizing the ore in a chamber which is so constructed and arranged as to be heated by the waste heat from a puddling reverberatory or other furnace, and at the same time to prevent the gases and products of combustion from coming in contact with the ore, except during the time of charging; and which likewise permits the charge of deoxydized ore to descend upon the puddling or preparatory hearth or bottom, without exposure to the atmospheric air. The patentee also describes and claims several less important arrangements.

JOHN VERINDER KIDDLE, of 4, Elder-street, Norton Folgate, Middlesex. *Improvements in cocks or taps.* Patent dated February 2, 1853. (No. 285.)

The peculiarity of this invention consists in combining metal barrels of cocks with plugs made of earthenware, glass, or porcelain.

No claim stated.

OWEN WILLIAMS, of Stratford, Essex. *Improvements in water-closets.* Patent dated February 2, 1853. (No. 286.)

Claim.—So arranging the parts of a closet that the soil and matters may be dried up or burned by heat suitably applied for the purpose.

ISMAEL ISAAC ABADIE and HENRI LAUREN, of Paris, France, umbrella and parasol manufacturers. *An improved manufacture of parasols.* Patent dated February 2, 1853. (No. 287.)

This invention relates to a novel arrangement of parts for opening and inclining the heads of parasols, or of folding or straightening the stick. The parts are severally described and claimed.

RICHARD ARCHIBALD BROOMAN, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agents. *Improvements in expansion-valves for steam engines.* (A communication.) Patent dated February 2, 1853. (No. 288.)

These improvements are designed to apply to balanced or poppet-valves.

The inventor claims a method of working expansion-valves by means of two motions derived from the engine itself, when one of the said motions is coincident or nearly so with that of the piston, while the other motion is derived from an eccentric, having its greatest velocity at the moment the piston is at its least velocity.

THOMAS SPILLER and ANTHONY CROWHURST, of 5, Red Lion-square, Middlesex. *The propelling steam-vessels.* Patent dated February 3, 1853. (No. 290.)

The inventors describe an arrangement of apparatus for propelling vessels, which consists of blades which are made to move vertically, their surfaces being inclined at an angle to the vertical, and consequently pressing against the fluid with a propelling effect.

Claim.—Vanes, blades, or fins of whatsoever form or wheresoever applied in a vessel for the purpose of propelling the same when such vanes, blades, or fins are mounted on an axle or shaft vibrating or turning freely upon its axis, and moving vertically through the water.

MANOAH BOWER, of Birmingham, Warwick, manufacturer. *A new or improved apparatus to prevent the throwing up of mud by the wheels of vehicles.* Patent dated February 3, 1853. (No. 291.)

This invention consists in applying scrapers or brushes to the wheels, either near the ground or otherwise, by means of rods attached to any stationary part of the vehicle.

JOHN HECKETHORN, of Marquis-villas, Canonbury, Middlesex. *An improved colouring matter for coating or colouring the exterior or interior of buildings, some of the ingredients of which such said colouring matter is composed being capable of conversion into size paste and ground colour, for priming or giving the first-coat covering to work intended to be covered with oil paint.* Patent dated February 3, 1853. (No. 292.)

This invention comprises the formation of several mixtures composed principally of blood and lime; but in some of them sand, marble, china, glass, oxide of iron, alum, cheese, pounded earthenware, fish shells, and white zinc, are added.

WILLIAM SCARLETT WRIGHT, of Pont-street, Belgrave-square, Middlesex. *An improved bath.* Patent dated February 3, 1853. (No. 293.)

The inventor describes and claims a bath with a seat, for the convenience chiefly of infirm persons. He proposes to call it a "chair bath," and in some cases to make a door in the side of it for the further convenience of those who may be too weak to enter it from above. This door is to be kept water-tight by means of strips of vulcanized India-rubber.

GEORGE JOHN NEWBERY, of Rose Cottage, Woodland-grove, East Greenwich, Kent. *Improvements in hinges.* (A communication.) Patent dated February 3, 1853. (No. 294.)

These improvements consist in forming the sides of hinges of several pieces, for the purpose of reducing their cost.

JOHN BOWER, of Dublin, civil engineer. *Improvements in and applicable to certain descriptions of engines for driving piles.* Patent dated February 3, 1853. (No. 295.)

Claims.—1. The adaptation and application to engines for driving piles of an endless tackle with stops and pulleys, together with a form and construction of ram capable of being raised to its required height, and allowed to fall at regular intervals, without interrupting the uniform course of the working barrel or capstan, as described.

2. The arrangement of upper and lower pulleys mounted in carriages, and capable of suitable adjustment by means of a screw and spiral spring, for the purpose of regulating the tension of the tackle, and obviating the necessity for moving the engine so frequently during the course of the work as described.

JOHN HENRY JOHNSON, of 47, Lincoln's-inn-fields, Middlesex, and of Glasgow, gentleman. *Improvements in gas-burners.* (A communication.) Patent dated February 3, 1853. (No. 297.)

The patentee describes and claims the construction of certain gas-burners with double jets, two or more converging jets, and converging jets in conjunction with a central aperture for the admission of a current of air; also, a supply regulator, consisting of a diaphragm valve, placed either within the tube which conveys the gas to the burner, or within the body of the burner itself.

ALFRED TYLOR, of Warwick-lane, Newgate-street, London, and HENRY GEORGE FEAM, of Herbert-street, New North-road, Middlesex. *Improvements in water-closets.* Patent dated February 3, 1853. (No. 299.)

This invention relates to the mode of supplying water-closets with water, and to the means employed in communicating motion to levers and valves used for that purpose.

WILLIAM BROWN, of Birmingham, Warwick, clerk of works. *An improvement or improvements in the construction of metallic bedsteads.* Patent dated February 4, 1853. (No. 302.)

Claim.—The constructing (by any convenient process) of a projection or dovetail on and of the same substance as the angle-iron forming the framing of metallic bedsteads, for the purpose of connecting the said angle-iron with the corner pieces or blocks of the said metallic bedsteads, in place of the dovetail usually cast on or otherwise formed, independently of the said angle-iron.

FREDERICK JOHN JONES, of Addle-street, London, manufacturer. *Improvements in fastenings for bands, belts, straps, and other similar articles.* (A communication.) Patent dated February 4, 1853. (No. 304.)

To the back of a metal plate the patentee affixes a metal loop at one side, and at the other side, opposite the loop, is a piece of metal bent over so as to form a hook. One end of the band is passed through the loop, and then through a separate loop called a "stop-loop," which is made rather longer than the fixed one, so that it may not pass through it; the same end of the band is then passed back through the fixed loop. To the other end of the band another loop is fixed, and this is brought round the body of the wearer and inserted into the hook on the back of the metal plate. The band can be lengthened or shortened by pushing it back in the fixed loop. The claim is for the employment of the "stop loop" in combination with the other parts of the belt.

PHILIP WEBLEY, of Birmingham, Warwick, manufacturer. *Improvements in repeating-pistols and other fire-arms.* Patent dated February 4, 1853. (No. 305.)

These improvements relate, 1. To a mode of supporting the main barrel of a revolving pistol upon a pin fixed in the frame or body of it, so that the said barrel may be permitted to turn in a plane parallel to that in which the rotating cylinder revolves, and also to a mode of strengthening revolving fire-arms; and, 2. To affixing the sear by a suitable hinge-joint to the hammer of the lock instead of to the trigger, as is usual.

GEORGE WINIWARTER, of 38, Red Lion-square, Middlesex, civil engineer. *Certain improvements in the application of explosive compounds.* Patent dated February 4th, 1853. (No 306.)

The first part of this invention consists in forming the three following explosive compounds. No. 1 is composed of fulminating mercury 300, chlorate of potassa 288, sulphate of antimony 312, charcoal and nitre (mixed in the proportion 16 to 7) 60, ferrocyanide of potassium 23, binoxide of lead 6, and etheroxylin (that is, 75 pyroxylin dissolved in 150 sulphuric ether) 900 parts. No. 2 contains fulminating zinc 75, chlorate of potassa 4, sulphite of antimony 7, binoxide of lead 15, ferrocyanide of potassium 1, and etheroxylin 224 parts. No. 3 consists of amorphous phosphorus 75, binoxide of lead 64, charcoal and nitre 15, and etheroxylin 106 parts. In forming these compositions, the materials are to be mixed by means of the machinery patented by J. M. R. Von Winiwarter, 1851.

The second part of the invention relates to the formation of shells composed of com-

mon cylindro-conical bullets, having their upper or conical parts charged with these compositions.

The last part of the invention refers to the application of the above compounds for gun-matches.

Claims.—1. The use of the above-described explosive compounds as a substitute for gunpowder, and the mode of loading with explosive compounds caked by means of etheroxylin or collodium, instead of using granulate powder.

2. The above-described method of using a bullet of the common cylindro-conical shape, as a shell.

3. The pressing gun-primers upon paper, which has been converted in etheroxylin, so that it burns off with the primer itself, without leaving any residue.

JOHN PERKINS, of Manchester, Lancaster, mechanical draughtsman. *Improvements in the treatment of certain bituminous mineral substances, and in obtaining products therefrom.* Patent dated February 4, 1853. (No. 307.)

Mr. Perkins' invention consists in distilling at a low temperature coal shales and other minerals, commonly called bituminous substances (not including coal), found in the carboniferous formation and yielding bituminous matter on the application of heat, and in obtaining therefrom paraffine, and an oil containing paraffine, and other substances. The apparatus used by the inventor is a common gas retort, built up in brickwork and heated by a fire, and to which is connected a coil of iron pipe immersed in cold water to cool and condense the products of distillation.

Claim.—The obtaining of paraffine oil, or an oil containing paraffine, and paraffine from bituminous mineral substances found in the coal formation, and known in their respective localities under the names of basses, black basses, bats, baes, greasy blaes, shining blaes, coal shales, argillo bitumens, or bituminous argils, bituminous sandstones and asphalt coals (not including bituminous coal), yielding bituminous matters by the application of heat, by treating them as described.

JOHN DUDGEON, of Saint Michael's Chambers, 42, Cornhill, London. *Improvements in machinery for raising propellers.* Patent dated February 4, 1853. (No. 309.)

The inventor describes a method of raising such screw propellers as are fitted to a sternpost abaft the rudder, by means of a rack and pinion, the bearing of the propeller sliding between the two parts of the after sternpost. No novel method of stowing the propeller when raised is shown, and consequently the great difficulty connected with the raising of such propellers remains. In the drawing furnished by the inventor, the propeller when partly raised is shown considerably within the midship lights of the cabin.

Claim.—Constructing and combining the parts in such manner that a propeller which works beyond the rudder may be separated from the propeller shaft, and raised with its bearing up the outermost post.

JACOB VALE ASBURY, of Enfield, Middlesex, surgeon. *Improvements in railway carriages.* Patent dated February 4, 1853. (No. 310.)

The object of this invention is to diminish the injurious effects of railway collisions. Mr. Asbury proposes to make the longitudinal frame pieces of the carriage no longer than that part of the carriage which is appropriated to the accommodation of passengers. This affords a large space for the pressures upon the buffers to act through before the carriages are subjected to impact. The forces of collision are received upon buffers, the rods of which are connected with, and made to act upon spiral springs, and blocks of India-rubber, arranged in cylinders beneath the bottoms of the carriages.

GEORGE LETTS, of Northampton, mechanic. *Improvements in machines for cutting and mincing meat and other materials for sausages and other like purposes, and for filling the prepared skins with the meat and other materials when so cut.* Patent dated February 4, 1853. (No. 312.)

In Mr. Lett's apparatus the blades or cutters are fixed to and arranged in spiral lines around a barrel, which is made to revolve in a cylindrical box or casing formed in two parts, the upper of which is hinged to the lower. At one side of the casing is fitted a comb, or slotted metal plate, so placed that the blades or cutters severally pass through the slots, or between the teeth of the comb, on rotary motion being communicated to the barrel by means of a handle attached to a fly-wheel. There may be more than one slotted plate fixed in the case, if thought desirable. The meat is fed in through a hopper at one end of the barrel, and is delivered at the other end through a spout or tube into skins, or other suitable receptacles provided for it.

Claim.—The construction of sausage-machines with the knives or cutters arranged in a spiral line or lines around the periphery of a rotating shaft or barrel, and working through slots in a plate or plates parallel to the shaft or barrel, whereby the meat and other materials are cut and minced, and then forced into the prepared skins or other receptacles.

WILLIAM WALKER, of Manchester, Lancaster, engineer. *Certain improvements in*

apparatus to be employed for the purposes of drying. Patent dated February 4, 1853. (No. 313.)

This invention consists in the application to drying purposes of metallic cellular blocks, or boxes, provided with a series of openings through them, for the admission and passage of atmospheric air. These blocks or boxes are placed round a furnace or fireplace enclosed in a brick-chamber in such manner that the heat from the furnace or fireplace shall circulate between and impart heat to them. The intensity of the fire is to be regulated by attaching a perforated plate to a suitable bar, in such manner that it shall work against another plate in front of the ash-pit with corresponding perforations. As the bar becomes heated or cooled it is lengthened or shortened, and the plate attached to it is moved accordingly, and the draught through the perforations of the plates is in this way diminished or augmented.

Richard Prosser, of Broad-street, Birmingham, civil engineer. *Improvements in the construction of printing-rollers used in machines for printing calicoes and other substances.* Patent dated Feb. 5, 1853. (No. 316.)

This invention consists in the employment of a hoop or cylinder of iron or other metal, conical inside and outside, interposed between the engraved printing-cylinder and the ordinary wrought-iron mandril on which it is mounted, so as to form one combined printing-roller.

Thomas Peacock, of Ashton-under-Lyne, Lancaster, hat and silk manufacturer. *Certain improvements in weaving, and in machinery for weaving hat-plush and other cut-piled fabrics.* Patent dated February 5, 1853. (No. 317.)

The *first* improvement under this patent relates to the production of piled fabrics woven double, and afterwards separated by cutting the pile-threads by which they are held together. It consists in arranging the warp-threads so that part of the threads from each warp-beam shall form part of the warp of each piece, and so that the healds through which these threads pass shall have corresponding motions; that is, shall both be drawn equal distances from the centre line. It is also recommended, when the pile-warp is all on one beam, to divide the threads which pass to the pile-healds, so that the tension may be put upon the threads by means of rollers connected with spiral springs, which enable the threads to yield to the motion of the healds without undue strain.

The *second* improvement is in a particular arrangement of the commonly-used mechanism for weaving cut-piled fabrics, and cutting them in the loom.

George Hewitson, of Bradford, York, machine-maker. *Improvements in machinery or apparatus for measuring or indicating the length of yarn as it is spun or wound on bobbins or rollers.* Patent dated February 5, 1853. (No. 318.)

This improved indicator may be attached to spinning, winding, warping, or such other machinery. It consists of an arrangement of two worm or tangent wheels upon the same centre, and worked by the same worm; one of the wheels having 59 teeth and the other 60. The under wheel is provided with an index, which is seen through an opening of the top wheel, and a finger fixed to this latter (which has the 59 teeth) indicates the quantity of yarn spun or wound. The worm which works the tangent-wheels is driven by gearing from any convenient part of the machinery, at such a speed as to turn the under tangent-wheel one tooth, and thus move only one figure of the index for every sixty revolutions.

Antoine Wollowicz, of Paris, gentleman. *Improvements in primers for fire-arms.* Patent dated February 5, 1853. (No. 319.)

These improvements consist in placing a number of caps or primers in a strap or band of leather, or elastic material, so that they may be more conveniently handled than if kept in a box. The strap is made about 6 or 8 inches long, and has an eyelet-hole at one end, by which it can be carried; and it is pierced with any convenient number of apertures or recesses, in which the caps are placed and retained by the elasticity of the material of which the strap is composed.

John Whitehouse, the elder, and John Whitehouse, the younger, of Birmingham, brass-founders. *Certain improvements in the manufacture of knobs for doors and other like uses, part of which improvements is applicable to the manufacture of certain articles of earthenware.* Patent dated February 5, 1853. (No. 320.)

This invention consists mainly of an improvement in the dry pottery process for making door-knobs, basons, cups, pipes, &c. The novelties will be readily gathered from the claims, which are—

1. The use and application of moulds or dies with moveable parts, by means of which the varying quantity of material required for parts of different thicknesses of the articles to be produced may be increased, diminished, or regulated.

2. A method of constructing compound dies for the purpose of making small articles of simple form, whereby the said articles when made may be removed from the dies with greater facility than when the compound dies or moulds are formed in one single block of metal.

3. The use of divided or segmental dies for the manufacture of articles of pulverized earthy materials.

4. A machine for manufacturing such articles with compound dies.

5. Constructing roses with a metallic plate or disc adapted thereto, for the purpose of receiving the screws whereby the rose is affixed to the door.

6. Adapting to the back of knobs for doors or cupboards a slotted plate, for the purpose of preventing their coming off.

CHARLES FREDERICK WERCKSHAGEN, of Barmen, Prussia. *Certain improvements in the manufacture of carbonate of soda and potash.* Patent dated February 5th, 1853. (No. 321.)

The following is the process adopted for manufacturing carbonate of soda:—Sulphate of soda is mixed with carbon, and calcined to produce sulphuret of sodium, and this is then decomposed by mixing it with an excess of bicarbonate of soda, and exposing the mixture in a moist state to a gradually-increasing heat in a reverberatory furnace. The product is then lixiviated, and the solution evaporated and dried. The carbonate of potash is produced in a similar manner.

ANDRE MICHEL MASSONNET, of Paris. *Certain improvements in alloys of metal and of other substances, and also in the application of the same to various useful purposes.* Patent dated February 5, 1853. (No. 322.)

The patentee forms his alloy of copper-dust or filings, 5 oz.; burnt calamine or zinc, 12½ oz.; bitartrate of potash, 10 oz.; hydrochlorate of ammonia or nitrate of potash, 5 oz.; and quick lime, 1¼ oz., melted together and cast into ingots. This compound may be further alloyed by mixture with copper, to produce imitations of the precious metals.

JOHN CAMPBELL, of Bowfield Renfrew, bleacher. *Improvements in the treatment or finishing of textile fabrics and materials.* Patent dated Feb. 5, 1853. (No. 324.)

These improvements have relation to what is technically known as the "gasing-machine," for the purpose of singeing off loose fibres, and giving the goods a clean finished appearance. They consist in combining the use of gas flames with heated metal plates or cylinders, both acting simultaneously on the fabrics; and in certain arrangements for raising or roughening the loose fibres before gasing, and for removing the dust and singed particles after the operation.

ALEXANDER PARKES, of Burry Port, Caermarthen. *Improvements in the separation of certain metals from their ores, or other compounds.* Patent dated February 5, 1853. (No. 326.)

The first of these improvements consists in the separation of gold and silver from their ores, or other compounds, by means of sulphuret of iron, oxide of iron, and carbon employed in conjunction.

The second improvement consists in the use of sulphate of lime or sulphate of baryta, together with oxide of iron, for the same purpose.

The third improvement consists in reducing silver from its ores by one fusion with oxide of iron, carbon, and fluor spar or lime.

The fourth improvement consists in effecting the separation of gold from its ores by means of metallic iron melted therewith, and afterwards separated from the gold which will have entered into combination with it, by sulphuric or muriatic acid.

The fifth improvement consists in separating gold and silver from their ores or compounds by means of the sulphurets or arsenical compounds of nickel or cobalt.

EDWARD PALMER, of Woodford-green, Essex. *Improvements in carriages used on railways.* Patent dated February 5, 1853. (No. 327.)

The patentee describes and claims—

1. A drag-carriage, which ordinarily runs on wheels after the train, but is capable of being lowered so as to slide on the rails when the train is to be retarded.

2. A mode of applying additional flanged-wheels or rollers to come into action in case of the ordinary wheels of a locomotive engine getting off the rails.

AUGUSTE EDOUARD LORADOUX BELLFORD, of Castle-street, Holborn. *Improvements in metal musical wind instruments to be called "Besson's system."* (A communication.) Patent dated February 5, 1853. (No. 328.)

The complete specification was filed at the time of application.

The improvements relate to what is known as Perinet's piston for cornets, &c. The claims are—

1. An arrangement of eight holes made in the pistons.

2. A mode of producing exterior circulation of the air.

3. Crescent-shaped holes, and their application to pistons of all kinds of metal musical wind instruments, whatever number of holes their pistons may have.

WILLIAM ROMAINE, of Sackville-street, Piccadilly, Middlesex, civil engineer. *Improvements in rendering wood more durable and uninflammable.* Patent dated February 7, 1853. (No. 330.)

Mr. Romaine describes two solutions in which the wood to be treated is boiled for three days, or four if it is oak. The

first solution, which is particularly fitted for rendering railway-sleepers, piles for docks, &c., durable, is composed of lime, tar, and water, in the following proportions. For saturating 50 cubic feet of timber he uses 3 bushels of unslaked lime, 1 gallon of oil or gas-tar, and as much warm water as will cover the wood. These are placed in a wooden or other tank lined with lead, and after the boiling is completed, the timber is removed and dried, either in the sun or in ovens heated to 60° or 70° Fahrenheit.

The *second* solution is prepared and employed in the same manner as the first, but 2 bushels of Roman cement, lute or amianthe, supplies the place of the lime and tar; lute being preferred. About 4 ounces of arsenic is to be added to the solutions when the timber is to be employed in the East or West Indies, to protect it from insects.

Claim.—The use and application of the ingredients or matters which compose the solutions above-mentioned in the manner and for the purposes described.

William Scott, engineer, Robert Brough, engineer, James Range, boiler-maker, all of Brighton, and Thomas Mann, engineer, of Stroud, Rochester. *Improvements in steam engines.* Patent dated February 7, 1853. (No. 331.)

The principal features of these improvements may be seen from the following claims:

1. The construction and employment of fireboxes or furnaces for locomotive and other boilers, having oblique partitions furnished with hollow stays or tubes.

2. The construction and employment of two safety-valves placed together, side by side, acting on one lever only, one of them being fitted, as in lock-valves, with a spiral spring. Also, a certain arrangement of ring-mitred safety-valves.

3. The construction and employment of a curve or sweep expansion-link for reducing the back pressure on the piston, by obtaining intervals of rest during the action of the slide valves, by which means a saving of steam is effected by its being used expansively nearly throughout the stroke.

Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agents. *Improvements in sail hanks for securing stay-sail jibs and other sails to their proper stays.* (A communication.) Patent dated February 7, 1853. (No. 334.)

The objects of these improvements are to effect a reduction in friction, to afford means of attaching and detaching the sail at any time, to facilitate the raising and lowering of the sails in gales and storms as well as in fine weather, and to increase the security from the fact of their always keeping a firm hold upon the sail.

The new hank is composed of a metal hoop divided into two halves, joined at their lower parts by a rivet or pin; the upper ends, after completing the form of a circle, are flattened and bent so as to form an ear or handle. A socket is also formed in the top part, into which the ears of a second and smaller divided ring can be inserted, and finally clamped by screw bolts. Upon the hoop a series of friction-rollers are strung, side by side, in number nearly sufficient to fill the hoop; they are, however, kept a short distance from the ears by stops. The ring is hinged near the ears, and opens on the opposite side.

Auguste Edouard Loradoux Bellford, of Holborn, Middlesex. *Improvements in the treatment of bituminous and asphaltic matters, rendering them applicable to various useful purposes.* (A communication). Patent dated February 8, 1853. (No. 335.)

This invention relates to a new method of preparing asphaltic and bituminous substances by rolling them, after necessary preparation. They are first fused in metal cauldrons, and then passed through a sieve placed above the rollers, between which they pass, and which are regulated according to the required thickness of the sheets. The cylinders are put in motion by hand or by any other power. On the right and left the rollers are placed at suitable heights and distances on each side of the sieve, winding off or dividing rollers, around which is passed continuously either paper, canvass, or any kind of cloth, or even a metallic fabric, in order to facilitate the rolling, and to give the rolled sheets a greater solidity, and a more uniform surface. The substances are rolled of all required thicknesses, according to the purposes they are intended for. In certain cases rolled sheets may be joined together and again laminated.

It is proposed to apply these bituminous and asphaltic sheets to the covering of all kinds of buildings, to the construction of pipes, coating of walls, laying of pavements, floorings, &c., &c.

There are no claims stated.

John Buchanan, of Leamington, Warwick. *An improved propeller as to affixing the blades in the boss, and affixing the bosses to the spindle or centre shaft, and in the mode of placing it, and in controlling, lowering, and detaching the same.* Patent dated February 8, 1853. (No. 337.)

Mr. Buchanan's screw propeller is to be placed abaft the sternpost of the vessel, in the position usually occupied by the rudder, the use of which he proposes to dispense with, as his propeller is intended both

to steer and to propel the vessel, or to steer her only when the propulsion is effected by means of the sails.

A frame is formed with two arms at right angles to each other, one of which is vertical, and carries at its lower end a suitable bearing for the axis of the propeller; and the other of which is horizontal, and extends forward above the propeller, carrying on the lower side of its fore end a pintle which works into a brace or gudgeon attached to a false sternpost. The axis of the propeller is connected at its fore end to the driving-shaft by an universal joint, in order that the rotary motion of the propeller may not be interfered with when the frame and propeller are together moved through any necessary angle for the purposes of steering. Each blade of the propeller is fitted so as to be capable of rotating in its boss; and when more than two blades are employed, each of them is made capable of rotating independently about the axis of the propeller, so that the whole of them may be brought to very nearly coincide with a fore-and-aft plane, when the propeller is to be employed for steering only, whereby all the qualities of a perfect sailing-ship are retained, and the injurious effects arising from the resistance of the ordinary screw when the vessel is under canvass are entirely avoided without the labour of raising the propeller, and without the inconvenience of the aperture necessary for that purpose.

Thomas Allan, of Adelphi-terrace, Westminster, civil engineer. *Improvements in protecting telegraph-wires.* Patent dated February 8, 1853. (No. 338.)

This invention consists in protecting insulated telegraph-wires, chiefly for submarine purposes, by means of iron wires so formed into a rope or twist round a central iron core as to leave room between the spiral twists of such wires for the reception of the insulated telegraph-wire. In a rope thus formed, the longitudinal strain and crushing effect will be borne entirely by the protecting-wires, while the insulated telegraph-wires will be fully protected from strain and other injury.

Thomas Allan, of Adelphi-terrace, Westminster, civil engineer. *Improvements in galvanic batteries.* Patent dated February 8th, 1853. (No. 339.)

These improvements relate to a new mode of arranging the elements of a galvanic battery, so as to cause the gases and liquids to circulate freely; and also to an arrangement for producing self-amalgamation in the positive metals in such manner as to produce a current of much greater force and constancy than is obtained by the mode now in use. For example, when the battery is composed of silver and zinc, the inventor places a zinc plate in a grooved frame of gutta percha, or other suitable material, and in the groove at the bottom of the frame he puts a little mercury in contact with the zinc. He then bends the silver plate round the plate-frame sideways and opposing both sides of the zinc. By this arrangement the zinc plate, being in contact with mercury, is always re-amalgamating itself, which totally prevents any local action and consequent waste of material. The formation of the oxide of zinc in the cells of the battery is also prevented, so that no alteration in the relative properties of the batteries takes place, and a constancy of action goes on until the positive metal is consumed. The negative plate, in consequence of being placed sideways, permits the easier evolution of the gases, thereby causing a freer production and greater quantity of electrical action.

Similar arrangements may be applied to other batteries with the same result of constant action.

COMPLETE SPECIFICATION FILED WITH APPLICATION.

John Carvalho de Medeiros, of Passy, near Paris, merchant. *Improvements in the means or processes for preserving metals from corrosion.* (A communication.) Dated August 1, 1853. (No. 1789.)

This invention consists in applying mercury or quicksilver to any metallic surface which possesses affinities for quicksilver; and it may be applied to metals possessing no such affinities, by means of an intermediate surface, such as galvanized iron.

Claims.—1. "The application of mercury or quicksilver to metals, whether singly, such as copper, zinc, lead, or other metal in alloys such as galvanized iron, or Muntz's metal."

2. "The discovery that amalgams of mercury so applied constitute a voltaic pile repulsive to sea animalculæ, such as barnacle or other shell-fish, and also to seaweed and other marine matters, containing animal or vegetable life, and prevents oxidation in excess, in the proportion of about 1 to 50 in copper, in its normal state, in sea-water, and 1 to 1,000 in common air."

PROVISIONAL PROTECTIONS.

Dated May 30, 1853.

1330. William Green, of Islington, Middlesex, engineer. Improvements in treating or preparing yarns or threads.

Dated July 20, 1853.

1716. Moses Poole, of Avenue-road, Regent's-

park, Middlesex. Improvements in gas-regulators. A communication.

Dated July 21, 1853.

1724. William Birkett, of Manningham Mills, Bradford, York, chemist. A method of cleansing or purifying and treating soapsuds or wash waters, so as to fit them to be again used for the washing of wools and other similar matters.

1725. Simon Charles Mayer, of Paris, France. An improved domino-bearer.

1726. William Thorp, of Collyhurst, near Manchester, Lancaster, dyer, bleacher, and finisher. Certain improvements in machinery for finishing and embossing plain and fancy woven fabrics.

1728. Edward Cockey, Henry Cockey, and Francis Christopher Cockey, of the firm of Edward Cockey and Sons, of the Frome Ironfoundry, Frome, Somerset, engineers. Improvements in the manufacture or production of cheese.

Dated July 22, 1853.

1729. James Murdoch, of Staple-inn, London, Middlesex. An improvement in stamping or shaping metals. A communication.

1730. Alexander Isaac Austen, of Trinity-place, Wandsworth-road, Surrey, engineer. Improvements in the apparatus used in the manufacture of mould candles.

1731. Thomas Gray, of Newcastle, tobacco-manufacturer, and John Reid, of the same place, engineer. An improved mode of manufacturing files and rasps.

1732. John Gillam, of Woodstock, Oxford, gentleman. Improvements in apparatus for cleansing and separating corn, grain, and other seeds.

1733. George Spencer, of Manor-road, Walworth, Surrey. Improvements in springs for carriages.

1734. Mary Ann Rylands, of Kingston-upon-Hull, widow and administratrix of Joseph Rylands, deceased. Improvements in yards and spars of ships and other vessels. A communication from her late husband, the said Joseph Rylands.

Dated July 23, 1853.

1735. Charles William Manby, of Grove-villas, Finchley, Middlesex, gentleman. An improved shaving-brush, to be called "the Traveller's Patent Shaving-brush."

1736. William Huntley, of Ruswarp, near Whitby, York, engineer. Improvements in engines worked by steam, air, or fluids.

1737. Auguste Buisson Lalande, of Bordeaux, France. Certain improved means for preventing accidents on railways.

1738. Frederick Warner, of the Crescent, Jewin-street, London, and John Lee, foreman. Improvements in water-closets and urinals.

1739. John Hall, of Bedford, machinist. An improved mangle.

1740. James Murdoch Napier, of York-road, Lambeth, Surrey, engineer. Improvements in letter-press and other raised surface printing-machines.

1741. Samuel Barlow, junior, of Stakehill, Lancaster, bleacher, and John Pendlebury, of Crumpsall, bleacher. Certain improvements in machinery or apparatus for bleaching or cleansing textile fabrics or materials.

Dated July 25, 1853.

1743. Joseph Aristide Furst de Rostin, of South-street, Finsbury, London, ship-builder. A new mode of constructing floating bodies.

1744. Alexander Clark, of Gate-street, Lincoln's-inn-fields, Middlesex, engineer. Improvements in regulating the speed and indicating the power of steam and other motive-power engines.

1745. William Ireland, of Leek, Stafford, gentleman. Improvements in the mode or method of melting or fusing iron or other metals, and in the apparatus employed therein.

1746. James Collins, of Oxford, soap-maker. Improvements in the manufacture of paper.

1747. Robert Bitten, of Dartford, Kent. Improvements in apparatus for ascertaining and indicating the supply of water in steam boilers.

1748. Warren de la Rue, of Bunhill-row, Middlesex. Means of treating and preparing certain tar or naphtha, and applying products thereof.

1749. John Ferguson, of the Heathfield Brick and Pottery Works, Glasgow, Lanark, North Britain, brick and pottery manufacturer. Improvements in kilns for baking or burning clay.

1751. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery or apparatus for stopping cables. A communication.

1752. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. An improved manufacture of cutting tools. A communication.

Dated July 26, 1853.

1754. Frederick Cole, of High-street, Camden-town, Middlesex. An improvement of the lithographic press.

1755. Frederick Cole, of High-street, Camden-town, Middlesex. Facilitating and improving the process of inking in printing.

1756. Alfred Walter Money, of Chudleigh, Devon. An improved bridle.

1757. Thomas Banks, of Derby, mechanical engineer, and Henry Banks, of Wednesbury, Stafford, iron merchant. Improvements in apparatus for retarding and stopping railway trains, which improvements are also applicable to vehicles travelling on common roads.

1758. Thomas Buxton, of Malton, York, agricultural implement-maker. An improved mill for grinding.

1759. Farnham Maxwell Lyte, of Florian, Torquay, Devon, Esq. Improvements in obtaining iodide of potassium when treating certain metals.

1760. Joseph Barrans, of Peckham-lane, Deptford, Surrey, engineer. Improvements in steam boilers.

1761. John Giblett, of Trowbridge, Wilts, woollen cloth manufacturer. Improvements in the manufacture of woollen cloths and other fabrics.

1762. Lansing E. Hopkins, of New York, U.S.A. The manufacture of hat bodies of fur and other like substances.

1763. Alfred William Warder, of Sydney-street, Brompton. Improvements in gas-stoves.

Dated July 27, 1853.

1764. Francis Arding, of the Albert Ironworks, Uxbridge, Middlesex, agricultural-implement manufacturer. Improvements in threshing-machines.

1766. Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, London. Certain improvements in the manufacture of tiles for roofing. A communication.

Dated July 28, 1853.

1768. Edward Herring, of Southwark, Surrey, manufacturing chemist. Improvements in the manufacture of sulphate of quinine.

1770. John Fordham Stanford, of Arundel-street, Middlesex. An improvement in the method of draining dwelling-houses and open and enclosed spaces in cities and towns where sewers and drains are now or may be hereafter constructed.

1772. Benjamin Collins Brodie, junior, of Albert-road, Regent's-park, Middlesex. Improvements in treating or preparing black lead.

PATENT APPLIED FOR WITH COMPLETE SPECIFICATION.

1789. John Carvalho de Medeiros, of Passy, near

Paris, merchant. Improvements in the means or processes for preserving metals from corrosion. A communication. August 1.

NOTICES OF INTENTION TO PROCEED.

(From the "London Gazette," August 5th, 1853.)

541. Edward Charlesworth. Improvements in bill or letter-holders.

554. Mary Ann Smith. Improvements in the manufacture of toys, models, and other like articles of ornament or utility.

558. William Todd. Improvements in steam engines.

566. André Calles. Certain improvements in manufacturing typographic characters.

571. Thomas Weatherburn Dodds. Improvements in the treatment and manufacture of iron and steel.

574. Thomas Weatherburn Dodds. Improvements in the manufacture of wheels and axles.

(From the "London Gazette," August 9th, 1853.)

509 William Matthews. Improvements in pianofortes.

576. Thomas Turner Chatwin and Robert Mc Leish. Improvements in rollers, rods or poles for window-blinds, curtains, maps, and such like purposes.

613. Charles Baker. Improvements in moulds for the manufacture of bricks.

640. William Stevenson. Improvements in the treatment or manufacture of textile materials.

649. George Knight and John Heritage. An improvement or improvements in drying bricks and such other articles as are or may be made of clay.

658. John Talbot Ashenhurst. Improvements in pianofortes.

706. John Henry Park and Joseph Park. Improvements in water-closets and urinals.

750. Laurence Frederick Keogh. Improvements in looms for weaving.

791. Christopher Garman Rosenkilde. Improvements in window-sash fastenings.

864. William Urquhart. Improvements in the manufacture of printers' type, and other articles used in letter-press printing.

953. Henry McEvoy. Certain improvements in the construction and manufacture of door-bolts.

976. Edward Onslow Aston and George Germaine. Improvements in compositions for coating wood, metal, and other materials exposed to the action of sea-water or the weather.

1330. William Green. Improvements in treating or preparing yarns or threads.

1529. John Leach. Improvements in looms for weaving.

1585. Joseph Rock, junior. An improvement or improvements in spring or clasp-knives, applicable to such other articles as shut or close after the manner of clasp-knives.

1636. Ewald Riepe. Improvements in the manufacture of turret or clock-tower and such like bells. A communication.

1637. Ewald Riepe. Improvements in moulds for steel castings. A communication.

1652. Joseph Bacon Finnemore. Improvements in sofa springs useful for spring-stuffed upholstery work generally, and in the adaptation thereof to mattresses.

1666. William Loveley. An improved method of making table-knife blades.

1685. Charles Liddell. Improvements in moving boats on canals and rivers.

1705. John Wallace Duncan. Improvements in adhesive soles and heels for boots and shoes, and in apparatus used for preparing and applying the same.

1709. Thomas Wood and George Wade. Improvements in machinery or apparatus for opening, cleaning, carding, or otherwise preparing cotton, or other fibrous materials to be spun.

1716. Moses Poole. Improvements in gas regulators. A communication.

1724. William Birkett. A method of cleansing or purifying and treating soapsuds or wash-waters, so as to fit them to be again used for the washing of wools and other similar matters.

1730. Alexander Isaac Austen. Improvements in the apparatus used in the manufacture of mould candles.

1734. Mary Ann Rylands. Improvements in yards and spars of ships and other vessels. A communication.

1752. Alfred Vincent Newton. An improved manufacture of cutting tools. A communication.

1760. Joseph Barrans. Improvements in steam boilers.

1762. Lansing E. Hopkins. The manufacture of hat bodies of fur and other like substances.

1763. Alfred William Warder. Improvements in gas stoves.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed August 5, 1853.

1853:

318. George Hewitson.
319. Antoine Wollowiez.
321. Charles Frederich Werckshagen.
322. André Michel Massonnet.
337. John Buchanan.
355. William Fulton.
371. George Winiwarter.
376. William Pidding.
377. William Pidding.
414. William Pidding.
435 James Anderson.
492. Robert Griffiths.
668. Malcolm Baxter.
694. John Barsham.
822. Edward Simons.
826. Henry Alfred Jowett.
994. William Johnson.
1056. James Greenwood.
1193. James Higgin.
1302. Julius Augustus Roth.
1366. Isaiah Kendrick.
1376. John James Kerr.
1380. William Dray.
1404. John Horrocks, junior, and James Dunlop Horrocks.
1411. Joseph Smith.

1412. Joseph Smith.
1419. Josiah Moore.
1421. Alfred Vincent Newton.
1458. William Baddeley.

Sealed August 8, 1853.

335. Auguste Edouard Loradoux Bellford.

Sealed August 9, 1853.

340. Thomas Reynolds, Henry Reynolds, and Stephen Reynolds.
390. Benjamin Greening.
470. Emile Adolphe Hermann.
473. Francis Preston.
474. John Hynam.
475. Benjamin Price
532. Robert Barclay.
728. Thomas Smedley.
981. Henry Houldsworth.
1030. Edward Bird.
1099. James Walker.
1131. Conrad William Finzel.
1223. Bernard Peard Walker and James Warren.
1306. Aristide Michel Servan.
1346. James Stocks, junior.
1379. Joseph Burch.
1416. James Robert Napier and William John Macquorn Rankine.
1423. Joseph Westwood and William Baillie.
1438. Robert William Sievier and James Crosby.
1440. John Henry Johnson.
1443. Alfred Vincent Newton.
1455. William Gossage.
1507. William Edward Newton.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1567.] SATURDAY, AUGUST 20, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

ROCK'S PATENT RAILWAY CARRIAGE.

Fig. 1.

Fig. 2.

Fig. 6.

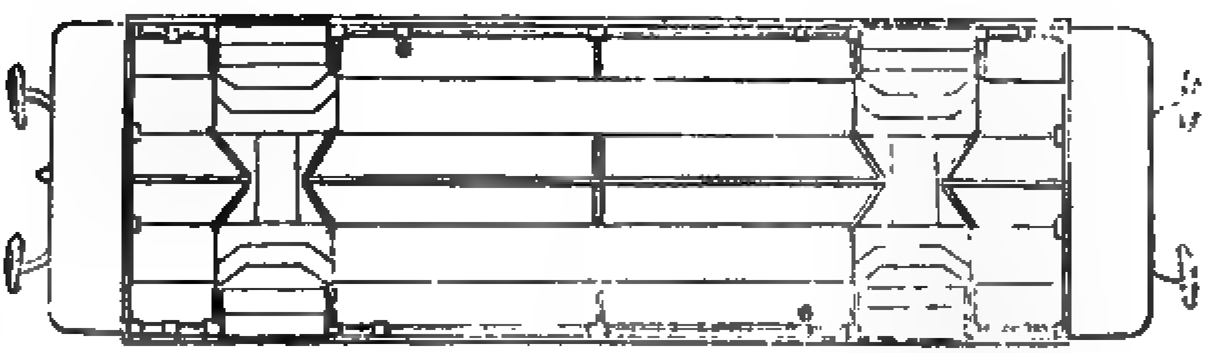
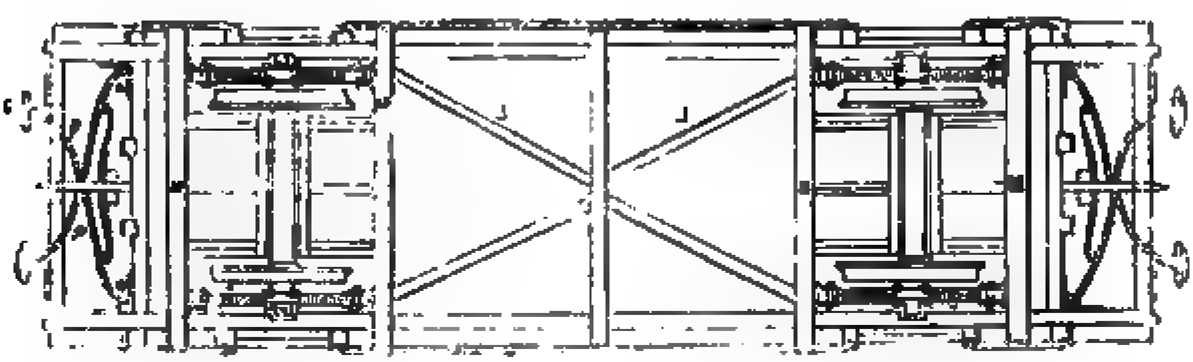


Fig. 7.



ROCK'S PATENT RAILWAY CARRIAGE.

(Patent dated October 30, 1852.)

THE accompanying engravings represent a new railway carriage lately patented by Mr. James Rock, junior, of Hastings, who is well-known as the inventor of the "Diorophа Carriage," and several ingenious improvements relating to railways. This invention has for its object the accommodation of a larger number of passengers than ordinary carriages of the same dimensions are constructed to carry. This is effected by the following arrangements:

The carriage is formed with two tiers of seats, the body being placed low, in order to give the necessary head-room for the passengers in each tier. Access is given to the upper tiers by means of side doors and staircases or steps, and to the lower or ground tier by means of doors placed at the ends, the body having a projecting platform, protected by railings at each end, to enable passengers to enter the end doors. A passage or thoroughfare is made from end to end of each carriage on the lower floor.

Fig. 1 of the engravings represents a side elevation of a carriage constructed with these improvements.

Fig. 2 is a longitudinal section.

Fig. 3 a plan or horizontal section taken at the height of the first-class seats.

Fig. 4 is a transverse section, showing the arrangement of the staircases; fig. 5 is an end view.

Fig. 6 is a plan, with the roof removed, showing the arrangement of the upper tier of seats.

Fig. 7 is an underside plan, showing the buffers.

Sufficient height is provided for a man to walk along the carriage without stooping, except at the gangway, by placing the upper tier of seats as shown in figs. 2 and 4, the space under the double seat, A A, in the centre, being thrown into the lower compartment for that purpose. The space under the side seats, A^1 A^1, is also given to the lower compartment. C C, fig. 4, are the staircases by which access is given to the upper tier of seats. D D are gangways from one side of the carriage to the other. B B are the end doors leading to the lower seats. E E are the platforms or galleries; F F are the railings; G G are the buffers; H H are the wheels; I I are the bottom sides, or main timbers; K K are end timbers framed into the sides; L L are diagonal braces; M M are transoms placed underneath the bottom sides, as shown. To these transoms the springs, N N, of the carriage are fixed by means of ironwork and shackles, in the usual manner, as shown in fig. 7, the ironwork being made to take the bottom sides also, for the greater strength. The wheels are placed under the staircases, and closed in from the lower compartment of the body by wooden partitions, K^1 K^1. H^1 are the axles, and H^2 the valve-boxes. O O are the upright pillars or framing of the body. The buffers, G G, are placed at the end of the body, in order to give foot-room for the passengers in the lower compartment, by throwing the space usually occupied by the buffer springs and rods into the interior of the carriage. The buffers are made with levers, P P, crossing each other, and centred to the body at *a a*, which are forced out by the buffer-springs, N^1 N^1, which also serve as draught-springs. By this arrangement the buffers have the power of adjusting themselves to any angle when the carriage is traversing a curve. R R are the outside panelling of the body.

When the improved carriage has the upper tier of seats uncovered, those seats are to be supported by the framing of the staircases, and by other framing rising from the lower part of the body, or attached to the upright pillars. When the upper seats are covered by a roof, the following arrangements are employed to give additional strength:—Strong upright pillars are fitted, into which the staircases, C C, are framed, supporting the upper seats. To the top of these pillars are attached strong crossbeams, *b b*, and from these

beams suspending-rods, *e e*, are hung, which rods are made to support the weight of the seat. The lower ends of the pillars are fixed on the outside of the bottom sides by means of clips and coupling-plates.

Fig. 3

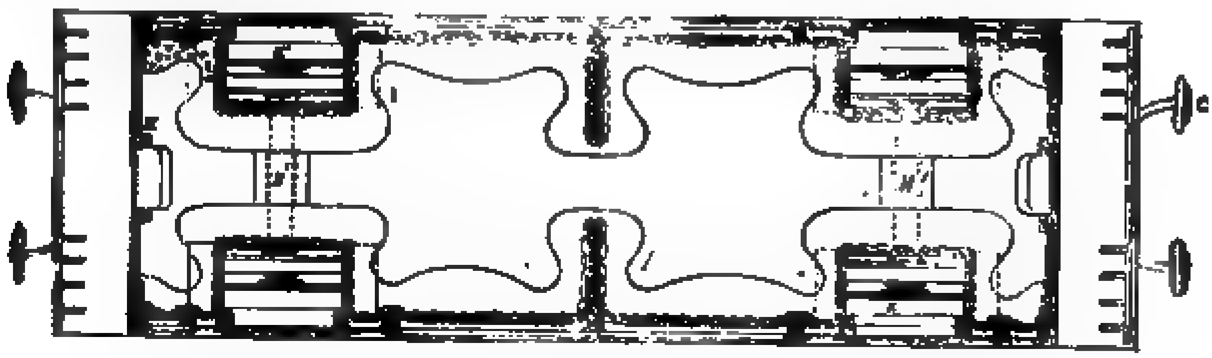


Fig. 4.

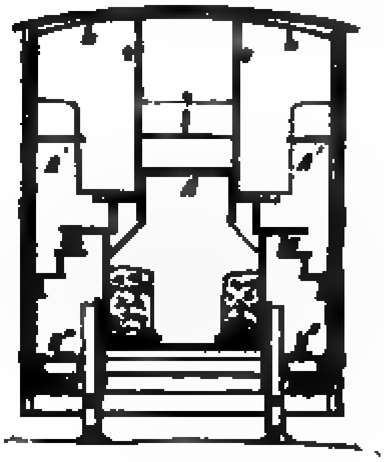
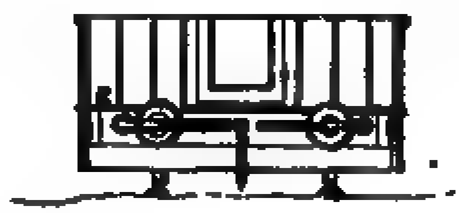


Fig. 5.



THE DUBLIN EXHIBITION.

We conclude this week our notice of the Dublin Exhibition with the following further extract from the *Civil Engineer and Architects' Journal:*

The manufacture of peat-charcoal is full of promise. This peculiar application of bog-turf has been promoted by the Society for the Amelioration of Ireland. The turf is first drained and compressed, and the clods are then burned in a covered kiln with their own fuel. The charcoal thus produced retains the form of the clod, but it is extremely light and pulverulent. Its deodorising properties are said to surpass those of animal charcoal, and for that purpose it is principally intended to be applied on a large scale. When mixed with sewage it removes all smell, and becomes a rich manure. For the purpose of disinfecting sick rooms, its efficacy is stated to be greater than that of chloride of lime, without producing the inconvenience often experienced from an excess of chlorine. The charcoal may be burned as fuel, and it is valuable as manure without any previous mixture. The bogs of Ireland may thus become a source of national wealth; and if all these advantages can be realized at an economical rate, a peat bog will prove as desirable a possession as a bed of workable coal. The specimens exhibited come from King's County, where there is a large surface of bog producing similar peat. The price at which the charcoal is delivered at any port in Europe is 40s. per ton, including the sixteen sacks in which each ton is contained.

The agricultural implements, the carriages, and a collection of handiworks from the Poor-law Unions, occupy a large semicircular space at the back of the main building; such addition having been found necessary to contain the many objects sent for exhibition, and it was not completed for admission of visitors till the middle of June.

The contributors of agricultural implements are numerous, nearly all of them being English or Scotch, including the names of Garrett, Ransomes, Crosskill, Barrett, and most of the distinguished makers. All kinds of improvements for facilitating agricultural operations are re-

presented, and among them are several portable steam engines of from one to four-horse power; though labour is not yet sufficiently scarce in Ireland to render the introduction of steam-power in agricultural operations desirable. Clod-crushing machines and subsoil ploughs are of much more practical importance, and of those there are some excellent specimens. Mr. Crosskill, of Beverley, especially, has contributed numerous implements adapted for the present agricultural wants of Ireland, among which is a machine for the application of peat charcoal as manure.

The collection of carriages is greater and of a superior description than might be expected by those not previously acquainted with the skill which Dublin coachmakers have attained. There are thirty-one contributors to this department, of whom twelve are Dublin, and only six London manufacturers. The style and workmanship of the Dublin carriages closely approach, if they are not quite equal to, those made in London; and Messrs. Hutton and Sons exhibit "a dress coach, fully appointed for town use, made for Her Majesty the Queen." There are not many jaunting-cars exhibited, and, to judge from the number of closed cars to be seen in the streets, it may be presumed that the outside back-to-back mode of conveyance is getting out of fashion in Dublin, though one has been ordered by Prince Albert. The first "Hansom" cab built in Dublin is one of the notabilia of the carriage department, where also is to be seen a specimen of the foreign-looking mail-cars of M. Bianconi, to whom Ireland is so much indebted for facilitating the intercourse between different parts of the country. Mr. J. Begbie, Haddington, shows a dog-cart, with shifting apparatus, enabling the driver to regulate the weight on the horse's back, without leaving his seat.

Contributions from the Poor-Law Unions in Ireland form a peculiar feature of the Dublin Exhibition. Thirty-six unions are exhibitors of works made by the inmates. From nearly every one there are specimens of frieze worn by the paupers; the manufacture of linens is a common product; tweeds and flannels are contributed by many; articles of clothing, and mats and rugs, are also abundant; and the Ballymena Union sends carpeting made from rugs worn out in the workhouse, and re-manufactured. Similar works have also been sent for exhibition from some of the gaols.

The Irish fisheries have a separate compartment allotted to them. The articles exhibited consist of various kinds of lines, nets, and hooks used on the coast and in the rivers of Ireland; harpoons, "trout-spears," and "eel-spears," models of boats and models of weirs.

The contributions from foreign states are arranged on the left hand of the central hall on entering. The Zollverein, France, Belgium, and Holland, occupy separate spaces, not enclosed as in the Great Exhibition, but merely divided by a partition from each other. This arrangement tends greatly to improve the general effect of the building, since nearly the whole width can be seen from most points of view. There is nothing massive sent from the continent, no machinery from France or from Belgium; nothing, in short, but small articles, to be met with in shops, most being evidently intended for sale There are, indeed, some fine specimens of Gobelins and Beauvais tapestry, and of Sèvres porcelain from the Imperial manufactories, and the King of Prussia and the King of Belgium contribute some objects in statuary; but the great majority of articles consists of bronze and iron ornamental castings, lamps, sets of porcelain, and other small objects, familiar to the visitors of the Great Exhibition, which are tastefully arranged on counters or against partitions.

A collection of articles from Japan, contributed by the King of Holland, forms an exception to the want of novelty in the other contributions from foreign states. This is the first time that such a collection has been exhibited in Europe beyond the museum at the Hague. It presents an interesting view of the state of art and manufactures in Japan, and affords a good opportunity also of comparing them with the works of the Chinese, a quantity of which are displayed in the immediate vicinity. The impression produced on the inspection of the two collections is, that the Japanese surpass the Chinese in the execution of useful works, but being more simple in their taste they do not bestow so much labour on elaborate and gilded decorations. As specimens of curious workmanship, there is nothing to approach the delicate carvings in ivory of the Chinese; on the other hand, the drawings and maps from Japan exhibit a much greater knowledge of perspective and of the principles of mapping than are to be seen in the absurd paintings from China. Beautiful silks and embroidery, an excellent mariners' compass, a pair of well-adjusted scales, gold coins of the value of £50 each, and paper money, display greater progress in manufactures and commerce, and in the arts of civilized life, than have been attained by the Chinese. At the same time, the prevalence of a barbarous taste is shown by manufactured monsters, consisting of the head

of one animal joined to the body of another, so as to produce in one instance a flying monkey, and in another a serpent with the head of an ape. The propensity to imitate European productions is manifest in several of the works of the Japanese, but in none more strongly than in the representation of the portraits of Boerhaave and "Jean Milton" in lacquer-work.

The mediæval court has been fitted up with great care and elaboration. Windows of stained glass, representing a number of figures of saints, serve to throw "a dim religious light" on altars, crucifixes, Paschal candlesticks, credence tables, priests' vestments, lecterns, chalices, ciboriums, monstrances, triptics, and other "furniture" of a Roman Catholic church. Mr. Hardman, of Birmingham, who has the charge of this department, has had the roof painted and gilded with various designs suited to ecclesiastical decoration, so as to give to the mediæval court almost a sacred character in the eyes of Roman Catholics, who enter it with looks of reverence that ill accord with the fiery glances of puritanical visitors. In various other parts of the building, symbols of the predominant religious faith present themselves in the forms of crucifixes, crosses, and figures of the Virgin and of saints.

The collection of paintings, which constitutes a distinguishing characteristic of the Dublin Exhibition, is perhaps the best that was ever seen in the United Kingdom. It comprises some of the most celebrated works of modern artists, long known from their engraved copies, several paintings by ancient masters, and numerous and interesting representations of the present state of art in Belgium, Holland, and Prussia. This magnificent collection has been contributed by the Queen, by various Irish noblemen and gentlemen, and, in the case of the foreign contributions, by influential application to the artists. It would not be suited to the *Journal* to give an extended notice of pictures; but it may be observed generally of those from Prussia and Belgium, that they exhibit in a striking manner proficiency in colouring and in the management of light and shade.

Returning to the central hall, to take a general view of the Exhibition in its finished state, the abundance of works of sculpture presents the most striking feature. These are distributed along the sides, down the centre, or are collected in a nucleus on a raised platform at the west end, there being no separate "court" for the display of such works. Conspicuous among the figures is a colossal statue of Mr. Dargan, represented in his ordinary dress, and standing with one hand in his trousers' pocket. Much critical discussion has been raised on this disregard of classical costume and attitude; some of the critics contending that he should have been enveloped in a Roman toga, whilst others approve the artist's taste in representing the Magnus Apollo of the scene as he appears to his fellow citizens. In the centre of the hall is a large ornamental cast-iron tent, with a canvas covering, from Coalbrookdale, the inside being filled with castings of all kinds from the same works. This tent obstructs the view too much, and impairs the general effect of the otherwise well-arranged objects of art and manufactures mingled together. Two fountains, one in terra-cotta, the other in cast-iron, are superior in ornamental decoration and are lighter than those in the Great Exhibition. The elevated platform at the farthest end, where some of the choicest works in precious metals as well as statuary are placed, materially improves the appearance of the hall; but there is wanting some commanding attractive object, like the glass fountain in the Crystal Palace, to concentrate attention. There is, indeed, throughout the Exhibition a deficiency in massive effect: the eye wanders about admiringly from one thing to another, without retaining a decided impression of any as a distinguishing object.

Origin, History and Description of the Bomerang Propeller. A Lecture Delivered at the United Service Institution on the 22nd June, 1853. By Lieut.-Colonel Sir T. L. Mitchell, D.C.L., &c. London: T. and W. Boone, New Bond-street. 1853.

This lecture, delivered and published in reply to some remarks in a paper read at the same Institution, May 18th, 1853, by Captain Robert Fitzroy, R.N., F.R.S., and printed and circulated by that officer, will be consulted with interest by many who are concerned in the subject of marine propulsion. The successful experiments already made with the bomerang have given it considerable importance, and created a general anxiety for the information indicated on the title-page of this pamphlet, with the contents of which we are somewhat dissatisfied. We have still to look for a truly scientific exposition both of the character of the Australian weapon, and of the propelling instrument suggested by it. Indeed we have experienced some pain, in looking over those parts of the author's lecture in which theoretical explanation is attempted. The following extracts, how-

ever, afford that kind of information concerning the bomerang which appears to have been much sought after since the late promising trials of the instrument in this country:

"When, sixteen years ago, I brought to England an account of a country I had then explored, and had found that it deserved the name of Australia Felix, the weapons of the aborigines I had been contending with engaged the attention of some learned men in England. One detected a great similarity between the bomerang used by the natives of Australia and a missile in use amongst the ancient Egyptians for killing ducks, as represented on the walls of a tomb at Thebes. Mr. Bailey, then Vice-president of the Royal Society, said that 'the path of the bomerang through the air was enough to puzzle a mathematician.'

"When again in Australia, I remembered the remark of that able mathematician; and on observing the missile's flight with particular attention, whirling round, at the same time that it was thrown to a considerable height in the air, I perceived that in its rotary motion the centre of gravity was quite clear and apart from its surface.

"I had a small model of a bomerang made of hard wood, adjusted to the plane of a fine screw, and attached to a centre, so that by the same method used to spin a humming-top I imparted to this model such rotary motion as made it ascend to the roof, which it hit with such force as to be broken in pieces.

"In order to try further experiments with this principle of centre-balanced surface, I endeavoured to determine a form which might be drawn between the centre and circumference of any given circle, so that it might be clear of the centre, which should be, nevertheless, the point of equilibrium."

The form accordingly determined may be considered as the projections of the edges of the blades of Sir Thomas Mitchell's propeller upon a plane at right angles to the axis of the screw. What he denominates "the expansion of the blade into the screw plane," has been accomplished, hitherto, "by setting up the form or skeleton of a screw of the given diameter and pitch adjusted to a ground plan" (the projection we have just mentioned), "and working the blades up the inclined plane, and shaping them by means of plummets, so as that the edges may coincide with the lines on the floor. By such means the peculiarity of convex and concave blade in this propeller has been derived from the form of the screw.

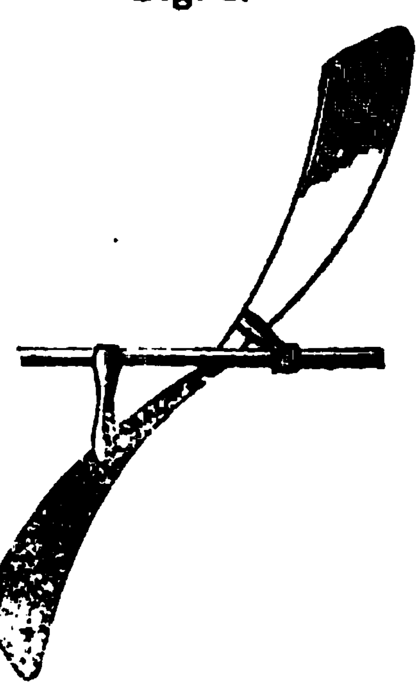
"*Mechanical Construction.*—When once understood by the pattern-maker, the construction of a bomerang propeller according to any given diameter and pitch, is easily accomplished. The draftsman chalks on the floor of the loft—the lines according to the given diameter.

"The ingenious carpenter builds his slips of wood on one another, like steps of a turnpike stair, and made of such widths at centre and circumference as accord with the greater or less thickness he intends to give to the different parts of the blade (see fig. 13, page 21,) which thicknesses are again adjusted to equilibrium, by suspending the whole pattern on a spindle before it is sent to the foundry. In this manner, and still adhering to rules originally derived from equilibrium and horizontal surface—an instrument for propulsion is made of uniform strength—poised horizontally and vertically—consisting of blades that are set on obliquely to the axis of rotary motion. As a propeller so constructed ought not to be liable to break at any one part more than at another, those hitherto made on this principle of construction, have been of much less weight than the propellers in present use—with which their action has been compared.

"The last-made propeller for H.M.S. *Conflict* has been made superfluously strong, and still it weighs less by 1 ton 2 cwt. than her common screw."

We come next to the practical application of the bomerang to the propulsion of vessels. The first experiment was made at Sydney with a whole bomerang of hammered iron placed at the bow of the boat.

Fig. 1.



"This is the identical propeller, the first of the bomerang form ever applied to water. It happens to have been deposited for some time in this Institution.

"I had taken from London to Australia, for the purpose of trying such an experiment, a set of driving wheels, having a multiplying power of *twenty-five*.

"A boat having been built expressly for the purpose at Sydney, the wheels were em-

ployed in her to drive the shaft, which was passed through a stuffing-box in the cut-water.

"The wheels inside were turned by two men, whilst I steered at the stern. In the face of a strong south-west gale, I found I could make considerable way, and that the rudder enabled me to steer directly in the wind's eye—the breakers coming over the men in the bow. But, in turning the wheels, they made the boat roll so much, that I was induced to send to England for a small steam engine of about three men's power. When this engine at length arrived, I found nothing could be done with wheels at such a high multiple as 25 to so small an engine, which was said to be quite '*over-wheeled.*' I was obliged therefore to have another set of wheels made in Sydney, with a multiple of 5 only.

"On the 10th and 12th October, 1849, I was at length enabled to steam through the water with the bomerang; and the results have been long since communicated to the public, through the pages of the *Mechanics' Magazine*."—(*See* p. 448, vol. lii.)

"These results were sufficient to confirm me in the opinion I had long before entertained, that I had quite enough of surface in my balanced form, and I felt then, as I feel still, the want of a proper opportunity for employing this screw *with high velocity*, to propel a ship. I ought here, perhaps, to mention that the pitch of both the propellers I employed in Port Jackson, was exactly equal to the diameter, a pitch which I still think will prove to be the best for doing great things with properly constructed vessels and machinery.

"But it was soon ascertained that none of the apertures in the dead wood of vessels would admit the bomerang, as one blade, and that it would be necessary to divide it into two blades. This could easily be done, still preserving all its properties of equilibrium, obliquity, concavity, and convexity, by attaching the blades to the shaft in the same relative position, only attaching them so that they occupied but half the fore-and-aft-space.

"In the remote colony where my official duties obliged me to remain, four years had elapsed after I had taken out a patent, and no prospect appeared even then of my having ever an opportunity of attaching to any vessel of sufficient dimensions to test on a large scale a propeller which had afforded such encouraging results with a boat.

"At length the *Keera* arrived in Sydney from England, with engines of 70-horse power, and a three-bladed screw, driven by a multiple of 3. The diameter of the propeller, was 5 feet 8 inches; the pitch 8 feet. With this propeller the vessel could be made to attain only an average speed of 6 or 7 knots per hour. The owners, Messrs. Smith and Co., allowed me to apply a bomerang propeller (cast at Sydney by Mr. Struth) of the same diameter and pitch as the *Keera's* own screw, which had 267 square inches more surface than the bomerang propeller made for this trial. The result was remarkable, and the local government and the public of Sydney felt so much interest in it, that I was allowed leave of absence from my office to come to England, that I might introduce this invention in the country to which they have to look across seas so vast, that any method of crossing them more rapidly appears to them important."

An account of the trial trip of the *Keera* will be found in vol. lvii. of our Magazine, p. 387. The blades of the propeller used in that vessel were of the exact form of the half-bomerang, which is not the case with any that have been tried hitherto in England. Fig. 2* represents the propeller of the *Keera.*

The great difficulty experienced by Sir Thomas is, as is well known, that of securing an aperture in the deadwood of the vessel sufficiently large to admit the instrument in an unmutilated state. As he says,

"So very narrow are the apertures left in screw-steamers for the common screw, that a portion of each half-blade nearest to the shaft has to be cut from the bomerang form of blade, and the external portion only of each blade employed—attached to the very short boss allowed in so confined a space—too narrow even for the thing now used. This is the form of the *Genova's* propeller, and of that made for H.M.S. *Conflict.* I was unwilling to lose so much working surface, as the parts cut off (marked *a b*) fig. 4,* and I endeavoured to retain them on the second propeller cast for the *Conflict*; but, although on trial the results were good, considering the weather; to make sure, at first, by trying which is best, these have been again cut off, and the trial of the bomerang propeller blades, as they were at first (fig. 3),* is to be made by permission of the Admiralty in a few days."†

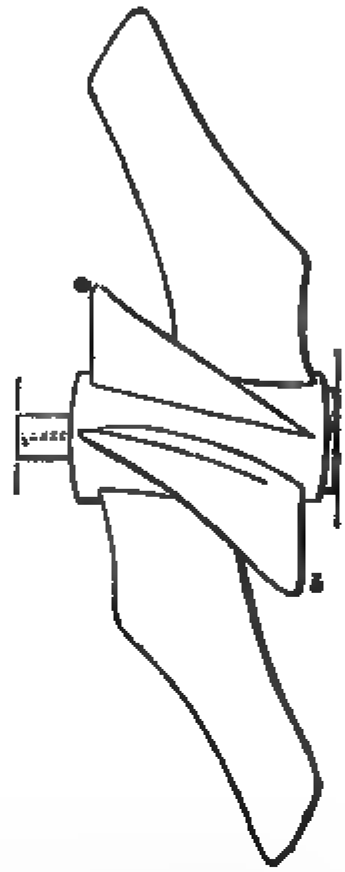
We have now presented to our readers as much of the pamphlet as we think is suitable to the pages of our Magazine. We have endeavoured to avoid the introduction of those sentences which were evidently written in both bad taste and bad temper.

* For figs. 2, 3, and 4, see the following page.

† The trial took place on the 4th July, and the result was greater speed than ever the *Conflict* attained before.

Whatever may have been the attitude assumed by Captain Fitzroy, we think Sir Thomas Mitchell could have well afforded to trust simply to the dignified expression of scientific facts for his defence and vindication; these we think would at any rate be found to strengthen his position more than an angry foot-note, or one of Bulwer's sonorous poetic effusions. We must also, object to the spirit of the following note which occurs on page 6. We will, however, give first the paragraph to which it is attached. "These lines" (referring to certain tangent lines in the projection before referred to), "radiate from a point in the midst of the inclined plane, and define a

Fig. 2. Fig. 3. Fig. 4.



form which affords more direct leverage than any form can which is defined by lines radiating from the centre as in many screw propellers." Then comes the note, "Mr. Griffith's blades have not that fault; and he may, therefore, be said to have taken his ideas from the bomerang, which was patented long before his *ball*." This is certainly an imprudent observation for a gentleman to offer, who is himself smarting under what he considers to be assertions likely to prove "damaging to his invention." Moreover, it is palpably absurd to suppose from the existence suspected of some relation which we confess ourselves unable to apprehend from the explanation of Sir Thomas, that Mr. Griffith's sphere was in any way derived from the bomerang. We are acquainted with persons who had noticed those defects of the ordinary screw which Mr. Griffith's invention is intended to remove, and indeed have ourselves discussed with those persons the application of exactly analogous remedies before either Sir Thomas Mitchell's, or Mr. Griffith's patent were known to us. So far are we from thinking that any one has heretofore filched from Sir Thomas Mitchell's invention, that we even doubt whether after the issue of the present pamphlet any new ideas on propulsion will be likely to be taken from his discoveries.

Cyclopædia of Useful Arts. Edited by CHARLES TOMLINSON. Part XXXIV. George Virtue.

WE have before had frequent occasions of noticing Mr. Tomlinson's Cyclopædia with considerable favour. The issue of the present Part affords us a further opportunity of commending the manner in which the work is conducted. The article on SCULPTURE, commenced in the preceding Part, is concluded in this; and in order to furnish our readers with a specimen of the very care-

ful, pleasant style in which the operations of art are described generally in the Cyclopædia, we extract from it the following account of the mechanical process adopted in the production of a work in marble.

"The sculptor first expresses his idea in a sketch on paper, and then makes a small model, generally in clay, or, for greater accuracy and perfection, a model of the size in which the marble, bronze, or wood, &c., is to be executed. The figure is first modelled naked, and in its proper action and form: he then lays on the drapery either from studies made after the living figure, or drapery placed on a lay figure or *mannikin*. The clay model, if large, is supported by a frame-work of iron, and the masses of clay are kept together by small wooden crosses attached to the iron frame-work, by wires of different lengths dispersed in different parts of the clay. The modeller's tools are of wood or ivory, with ends pointed, rounded, square, or diagonal, with which he forms his model, marks out the hollows and dark parts, and does whatever his unaided fingers cannot effect. The clay must be occasionally sprinkled with water to prevent the model from shrinking and cracking, and when left for some hours it should be covered with a damp cloth. The clay model being finished, it is moulded and cast in plaster, the plaster being supported by iron bars cemented, to prevent the rust coming through. If the work is to be executed in bronze, particular attention must be bestowed on the mould, to enable it to bear the weight of the fluid metal.

"The model is copied in marble in the following manner:—A number of small black points are marked upon the model in every principal projection and hollow, so as to give the distances, heights, and breadths, sufficient for copying with the marble from the model. The ancients did this by considering every three points on the figure as a triangle, which they made in marble to correspond with the same three points in the model, by trying it with a perpendicular line or some other fixed point, both in the marble and the model. The modern method is this:—After having ascertained by rough measurement that the block of marble is sufficient to make the statue of the size of the model, it is fixed on a stone base or wooden bench, called a *banker*, in front of which is a long strip of marble divided into feet and inches. A similar strip is placed in front below the model, together with a wooden perpendicular rule the height of the whole work: this rule can be taken from the marble graduated scale under the model to the marble scale under the marble block. The rule being first placed upon the scale of the model, and the exact distance taken from it to any prominent part, as, for instance, the end of the nose, is then removed to the corresponding position of the other scale, and the workman cuts away the marble to the same distance from the perpendicular at the same height; that is, until he has arrived at that portion of the block which is to form the tip of the nose. He then proceeds in the same way with some other prominent part, such as the top of the head, until at length he has produced a rough representation of the whole figure.

"Machines have also been contrived for producing the same effect with greater convenience and rapidity. One of them, called a *pointing instrument*, consists of a pole or standard, to which a long brass or steel *needle* is attached, so as to admit of being extended and withdrawn, loosened or fixed, and moved in every direction by means of a ball and socket-joint. This instrument being made to touch a particular part of the model, it is removed to the banker, and the marble is cut away until the needle reaches as far into the block as it had been fixed at upon the model. A pencil mark is then made upon the two corresponding parts of the model and block, and a *point* is thus said to be taken. By a frequent repetition of the process, the various points at fixed depths, corresponding with the surface of the model, give a rough copy of the intended work. The work is sometimes performed by drilling. For example, the workman measures how far any particular part of his model, such as the tip of the nose, is from the front of the banker, and having found the proper position of the corresponding point of the block of marble, he drills a hole to the same depth from the front, as in the model. Other prominent points are, in like manner, measured, and holes are drilled to their proper depths from the front, until at length the block of marble presents a honeycombed appearance from the numerous drillings. The portions of marble between the holes are cut away with the chisel, care being taken not to chip away any of the stone below the drill-hole. Mr. Behnes has contrived an improved machine on this principle.

"When at length the figure has thus been *roughed* or *blocked* ought, the mechanical art merges into the fine art. The sculptor now takes the dead mass in hand, and imparts to it that artistic life which conveys to the beholder beauty of form, mental and anatomical expression, and a well-defined purpose. How this is done cannot be told in words. The mechanical aids are steel chisels, varying in breadth from an inch to a mere point, and for deep parts drills are also used. The sculptor goes over every

part of the surface of the marble, urging the chisels with hammers of from 2 lbs. to 4lbs. each. In this work, however, the sculptor is frequently assisted by a superior workman, called a *carver*, who knows by the pencil-marks how far he can penetrate into the marble. After the chiselling the surface is gone over with rasps, and then with sharp files. The smooth parts are rubbed up with pumice-stone or grit-stone, cut to suit the various forms of the surface."

The most important articles in the remainder of this Part are upon seal-engraving, sewerage, ship-building, silk and silk-machinery, silver, slating, and soap; that on the latter substance waiting its completion in the following Part. The peculiar merit of several of these causes us to regret the want of space for a more lengthy notice of them.

COATING IRON WITH COPPER.—WATTS' AND BURGESS' PATENT.

This patent has just been taken out for coating iron nails, bolts, sheets, and tubes with copper or brass. As this is effected by fusion, none of the injurious consequences that take place when the coating is deposited by electrical agency can occur. A long series of trials have been conducted at Woolwich Dock-yard, in which iron bolts and deck nails, coated with copper throughout their length, and having solid copper points fused to one or both ends, have been experimented upon. The copper ends are made sufficiently long to clench. These tipped or compound bolts are quite a novelty in ship-building, and possess all the advantages of solid copper bolts.

The experiments in Woolwich Yard, under the direction of Charles Atherton, Esq, Chief Engineer, commenced with trials to ascertain whether the coating process acted injuriously upon the iron. Bars of iron of various sizes were cut into equal lengths, and a certain number of each size were then coated. These were tested in the hydraulic-machine with an equal number of the uncoated lengths; no difference in their strengths could be perceived. Other lengths were subjected to cold hammering, being bent double and beaten close, but the texture of the iron was not at all injured. Iron bolts with a solid end of copper were then turned to exactly an inch in diameter and placed in the proving-machine; in all cases the fracture took place in the solid copper, and not at the juncture of the two metals, which it was afterwards found impossible to sever with a strain equal to 21·6 tons to a square inch.

Deck nails were then driven into deal and African oak without injuring the heads, although in some instances no hole was bored to receive them. Two logs of African oak were bolted together with the pointed bolts, which were afterwards clenched in the usual way; the logs were then wedged asunder, the heads drawing through the solid wood. This experiment was repeated, a copper bolt being substituted for one of the compound bolts; when the logs were set apart the copper bolt drew through the rings, the other standing firm. The trials were pronounced highly satisfactory by the officers appointed to superintend them.

Launch of the "Peninsula" Iron Screw Steam-Ship.—On Saturday Aug. 6, the first of a new line of screw-steamers for the Spanish and Portuguese Screw-steam Shipping Company was launched from the yard of Messrs. William Joyce and Co., engineers and iron ship-builders, Greenwich.

The following are the principal dimensions; viz.—

	Feet.
Length between perpendiculars ..	190
Ditto, over all	225
Breadth of beam	25
Depth of hold	15

Burthen about 600 tons, O.M.

The launching was successfully performed.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

Thomas Reynolds, of Singleton-street, Hoxton, Middlesex, gentleman, Henry Reynolds, of Hoxton, engineer, and Stephen Reynolds, of Charles-street, Westminster, coffee-house keeper. *Improvements in the means of retarding the progress*

of carriages. Patent dated February 9, 1853. (No. 340.)

This invention relates to an arrangement of apparatus by which a series of breaks may be brought to act simultaneously upon the wheels of all the carriages throughout the train. The break of each carriage is provided with one or a pair of weighted levers, which force the breaks into contact with the wheels, and which at one end are mounted on a pin or stud, and at the other are connected with a sliding-block or bar, by lifting which the break-levers are raised, and the wheels relieved from the extra friction.

Claims.—1. The mechanical arrangements described for working the breaks of railway carriages.

2. "Coupling the retarding apparatus of railway carriages together by means of universal joints," whereby they may be brought into action or released simultaneously.

HENRY POOLEY, of Liverpool, Lancaster, iron-founder. *Improvements in weighing machines.* (Partly a communication.) Patent dated February 9, 1853. (No. 341.)

Claims.—1. The method, or any mere modification thereof, of detaching or disconnecting the steelyard from the platform and its levers below, and attaching or reconnecting the same when required by means of pendent hooks or links, which may be connected or disconnected by means of a hand-lever or other suitable contrivance.

2. Regulating the acceleration proper to compound lever weighing machines, by means of an adjustable weight.

3. The use and application of separate or removable lateral knife-edges, for the purpose of diminishing the friction of the working parts.

WILLIAM BIRKETT, of Manningham-mills, Bradford, York, chemist. *Improvements in treating soapsuds or wash-waters in which soap has been used.* Patent dated February 9, 1853. (No. 345.)

After wools or other similar goods have been washed, the inventor allows the waste waters to escape out of the vat or vessel which contains them through charcoal filters (preferring peat charcoal for the purpose) into another vat or receiver, and then adds a quantity of alkali to them, the proportion of which varies according to the goods washed; the waters are then again fit for washing. The process is repeated until the whole of the cleansing properties of the soap are absorbed.

Claim.—The employment of peat or other charcoal to cleanse and purify soapsuds or wash-waters, together with the addition of alkali to such purified suds, in order to make them act again as a detergent.

JOHN SEAWARD, of the Canal Iron-works, Poplar, Middlesex, engineer. *Improvements in marine engines.* Patent dated February 9th, 1853. (No. 346.)

A full description of this invention formed the first article of our last Number.

ISAIAH JAMES MACHIN, of Leigh-street, Middlesex, engineer. *An improvement in nutcrackers.* Patent dated February 9, 1853. (No. 347.)

This invention consists in making the pressing end or head of the screw of "screw nutcrackers," capable of turning round its axis, by which arrangement it is caused to remain steadily in contact with the nut during the time the screw is being turned, and thus the kernel of the nut is preserved from being broken or crushed after the shell has been cracked.

CHARLES ILES, of Peel Works, Birmingham. *Improvements in pointing wire.* Patent dated February 9, 1853. (No. 348.)

In Mr. Iles's apparatus the wire is pointed by a machine into which it is fed through a fixed tube, on which there is a pulley driven by a band or strap. This pulley has fixed to it a boss or projection, which is hollow and moves on the tube. The boss carries a lever which has a tendency to stand off from the centre communicated to it by means of a spring. Around the boss and its lever is a collar capable of sliding along it, which by being slided causes the outer end of the lever to approach the centre by pressing it into a groove in the boss. The lever carries a cutter, the edge of which is formed to give the shape desired to the point.

JOHN WEBSTER, of Ipswich. *Improvements in treating animal matters and in manufacturing manure.* Patent dated February 9, 1853. (No. 349.)

This invention consists in subjecting the rough fats of animals to the action of dilute sulphuric acid, and boiling the mixture, by which means the animal matters other than the fats combine with the acid, and when allowed to stand, subside, and the fatty matters may be run off and washed, any remains of acid therein being neutralized by chalk. The acid and animal matters are then used to dissolve bones or mineral phosphates for making manures in place of sulphuric acid, which has not been previously used.

CHARLES CUYLITS, of Antwerp, Belgium, merchant. *Improvements in apparatus for regulating or governing the speed of steam or other engines.* (A communication.) Patent dated February 10, 1853. (No. 352.)

The patentee constructs his engine governors by taking any apparatus for raising water and setting it in motion by the machine or engine to be regulated so as to cause it to raise water into a vessel from

which it will again run out by an orifice, the area of which is capable of adjustment. The vessel is furnished with a float, which is connected with the steam port of the engine, and the exit aperture of the vessel is arranged so as to correspond exactly in its operation to the movements of the float. When the engine is running at its proper speed the pumping apparatus should be arranged to raise a given quantity of water per minute, and the exit aperture to allow a like quantity to escape from the vessel, so as to maintain the float at any given level. When the speed of the engine, and consequently that of the pumping apparatus, is increased, more water will be raised than can escape from the vessel, and the float will therefore be raised, and will act on the throttle valve or steam port, so as to cut off the steam and reduce the speed of the engine until it reaches a proper rate; and when the supply of water is less than escapes from the vessel the float will sink, and by its descent open the steam port, so as to give an additional supply of steam to the engine.

Claims.—1. Regulating the speed of engines by means of a head of water always maintained in a suitable vessel above the orifice for the escape of the water, such water being made to act on a float connected in any convenient manner with the throttle-valve of the steam or other supply-pipe of the engine.

2. The application of a hydraulic wheel for the purpose of supplying the vessel with water.

3. The application of a centrifugal or ball regulator for the purpose of accelerating the ascent of the float.

4. A means of counterbalancing the pressure of the steam upon the valve, when this latter approaches the extremity of its course.

William Fulton, of Paisley, Renfrew, bleacher. *Improvements in the treatment, cleansing, or finishing of textile fabrics.* Patent dated February 10, 1853. (No. 355.)

The invention relates to the process of bleaching or finishing woven goods and yarns, by "sulphuring." Instead of depositing the goods in a sulphuring-chamber, the sulphur is applied by passing the fabric over the sides and top of the chamber in contact with an endless web of felt, haircloth, or some thick material which is constantly traversed through the chamber, and so becomes saturated with the sulphurous vapour. The goods to be treated are conveyed along the saturated portion of the endless web, and covered over with another endless web to keep in the fumes, and are thereby well sulphured in their transit as the endless web passing through the chamber draws out a sufficient supply of vapour, and applies it to the goods brought in contact with it. The same contrivance may also be adopted for steaming or damping. Where the old system of sulphuring is adopted, the goods, instead of being hung in the chamber, may be hung on frames which can be run in and out alternately, one being in while the other is filling; or if the goods are on rolls, they may be drawn directly off from the interior of the chamber through a slit, and wound upon a beam in readiness for the next process of treatment. Various modifications of these general systems may be adopted.

Robert Ash, of 211, High-street, Borough of Southwark, Surrey. *Improvements in stopping bottles and other vessels.* Patent dated February 10, 1853. (No. 359.)

This invention consists in making a stopper of two parts, one to enter the neck of a bottle or other vessel, and the other to cover the opening of this part, which is tubular, and coated with a yielding elastic substance on the outside. Near the upper end of the tubular part a flanch is formed, which corresponds with another flanch formed on the cap or cover, and between the two a cement is applied.

George Hutchinson, of Glasgow, Lanark, merchant. *Improvements in treating oils and other fatty matters.* Patent dated February 10, 1853. (No. 360.)

Claims.—1. The purifying of neutral fats or oils to be used in the manufacture of oily ethers from the natural impurities derived from the cellular tissues in which they were contained, by treating them with chloride of lime, dilute sulphuric acid, an alkaline solution, or like suitable re-agent.

2. The use of a neutral oil or fat with alcohol and a suitable acid in the manufacture of oily ethers.

Charles Breese, of the firm of Breese and Hayward, of Birmingham, Warwick, japanners. *Improvements in ornamenting papier maché, japanned iron, china, and other hard or bright surfaces with gold.* Patent dated February 10, 1853. (No. 361.)

After the surface to be ornamented has been polished, the inventor washes it over with a solution of isinglass and water, and while wet he lays on it gold leaf in the usual way, and allows it to dry. He then takes an impression on sized tissue paper from an engraved plate, or stone, or other source, with a composition formed by boiling asphaltum varnish until it assumes the consistence of putty, and thinning it down with a little linseed oil and gold size to the proper consistence, and transfers the pattern produced in such composition on the paper to the surface of the gold, and after damping the paper draws it off, leaving the pattern

on the gold. When sufficiently dry he removes the superfluous gold-leaf by rubbing with a little cotton-wool damped in water, or by pouring on it dilute nitro-muriatic acid, which bites away the gold not covered by the pattern. The composition is then washed off with turpentine or other suitable spirit, and the pattern appears in bright burnished gold.

William Potts, of Birmingham, Warwick, manufacturer. *Improvements in sepulchral and other commemorative monuments.* Patent dated February 10, 1853. (No. 363.)

This inventor describes and claims a method of moulding sculptural and other designs for the monuments named in the title in a plastic or fluid material that will harden to a polishing surface, without firing, in elastic or piece-moulds, so as to produce under-cut or shadowy effects.

Sir James Murray, Knight, M.D., Dublin. *Improvements in the deodorizing cod-liver oil, in rendering it more agreeable and easier to use, either by itself or mixed, and so as to be capable of being administered in larger quantities and with greater success.* Patent dated February 11, 1853. (No. 365.)

This invention consists in impregnating the oil with carbonic acid gas, by subjecting it to great pressure and agitation, and passing streams of the same gas through it, and then infusing fixed air into the former oil that is left after the gases or elements containing any unpleasant odours or fetid flavours have been discharged into the atmosphere. The oil may be used in this state, or it may have mixed with it while under pressure, and in a state of agitation, such mucilaginous, alkaline, and other solutions as may be found desirable.

These objects may be effected by placing the oil of other materials (if any) to be carbonated in cylinders made of silver or any other safe and suitable material, capable of bearing a pressure of many atmospheres. The inventor prefers a pressure of about 200lb. per square inch. The cylinders should be suitably mounted with axles, and furnished with agitators, fans, or beaters revolving within the cylinders, so that when the fixed air is pressed or forced into the cylinders, the agitators are put into action, and separate the molecules or integral globules of the oil, and more effectually divide it into its ultimate particles, so that the carbonic acid gas may be most intimately blended with every film of the oil itself, if that alone is the material to be carbonated, or with such other materials as it may be thought desirable to mix with it. Any apparatus suitable for carbonating aërated waters may be employed in the treatment of this oil or its admixtures.

Claim.—The disintegration or separation of the particles of which cod-liver oil is composed, by means of a high degree of pressure and suitable agitation unexposed to the atmosphere, and the infusion thereinto of carbonic acid gas in streams, by which the oil, either alone or combined with other suitable material, may become thoroughly impregnated with the same.

William Choppin, of London, lockmaker. *Improvements in locks.* Patent dated February 11, 1853. (No. 367.)

The *first* of these improvements is applicable to single shot locks, or to those in which the key makes only one revolution, and consists of a peculiar lever termed a "double paul," and a circular plate, having a portion of its periphery cut or notched like the teeth of a saw, which act so as to hold or detain a false key, and prevent its withdrawal.

The *second* of them relates to that class of locks in which the bolt is projected by two or more revolutions of the key, and the object of it is to prevent a key which has made one or more of the shots in one direction from turning them back in the other, unless the whole of the shots have been made in the original direction. For this purpose a plate is secured to the bolt or tumbler-box by screws, and thus travels with the bolt. This plate has a double keyhole, and slot cut in it, and acts in such manner that a false key having passed one set of tumblers, would be held securely by a paul.

Robert Davis Rea, proprietor of the Great Central Horse and Carriage Repository, St. George's-road, Southwark, Surrey. *Improvements in bits.* Patent dated February 11, 1853. (No. 368.)

This invention consists in so constructing and adapting a bit or bits fixed in the mouth of the animal to which it is applied, as to affect various and different parts of the mouth from the nipper teeth upwards, and in some cases to fill the space in the inside of the mouth between the nippers and grinders as required by the person directing the animal, by which the most sensitive parts are acted upon, and a more perfect control over the animal is acquired, whether in leading, driving, or riding, and this according to its disposition.

George Winiwarter, of 38, Red Lion-square, Middlesex, gentleman. *Improvements in fire-arms.* Patent dated February 12, 1853. (No. 371.)

These improvements relate to breech-loading needle fire-arms. They consist in an arrangement of parts by which the connection between the barrel and the stock at the breech is rendered more perfect than ordinarily, and also in a method of greasing

the needle when necessary. The improvements are exhibited in the drawings as applied to pistols.

GEORGE HENRY BURSILL, of Offord-road, Barnsbury-park, Islington, engineer. *Improvements in operating upon auriferous quartz, clays, and other minerals, preparatory to, and in order to accomplish the separation of the gold and other metals, also in machinery or apparatus for effecting such improvements.* Patent dated February 12, 1853. (No. 374.)

The first part of this invention consists in the employment of a caustic ley for cooling or disentegrating auriferous quartz or other metal bearing mineral, the hardness of which is attributable to silica or other matter having when hot an affinity for caustic soda or potash, and in the subsequent purification of such ley, to enable it to be repeatedly employed.

The second part of the invention relates to the treatment of earthy matrices containing gold or other metal, and composed chiefly of alumina, lime, &c.; these the patentee crushes and submits to a washing operation, in which the water is admitted beneath the ore, and made to flow gently upward; and he finally uses acid to effect the solution of the matrix.

The third part of the invention consists in the use of a readily fusible alloy of bismuth, tin, and lead, or an amalgam of the same with mercury, for the purposes of securing gold and silver from the mineral with which they are associated without smelting, properly so called; that is, without the actual fusion of the matrix.

The fourth part of the invention consists in a method or means of bringing ores forcibly in contact with mercury, the degree of force exerted being regulated according to the height of a column of mercury, through which the ores in a state of meal, or finely granulated, are caused to pass.

GEORGE LEE LYSNAR, of 85, Park-street, Grosvenor-square, Middlesex. *Improvements in swivel-hooks, and such like fasteners.* Patent dated February 12, 1853. (No. 375.)

This invention relates to the formation of swivel-hooks, and other such fasteners, each with one portion of the side capable of sliding up and turning on the axis, the moveable part being constantly pressed upon by a spring tending to hold it shut. By this means the article within the eye will be securely retained till the moveable part is slided, and then turned on its axis in opposition to the spring, by which means a more secure and safe swivel-hook will be produced.

WILLIAM PIDDING, of the Strand, gentleman. *Improvements in crushing, drilling, or otherwise treating ores, stone, quartz, or other substances in mining operations, and in the machinery or apparatus connected therewith.* Patent dated February 12, 1853. (No. 376.)

Mr. Pidding proposes to use rammers sliding on horizontal or inclined rails, and projected against the face of the rock "by detonating force, either by gunpowder or by steam power," for the purpose of compressing, crushing, or drilling the rock previous to or after blasting. The rammers have springs connected to them, by the retractile force of which they are brought back to their original position, after having been projected by the power employed. There is no new machinery described, but the rammer and appurtenances are to resemble a pile-engine, and to act horizontally or in an inclined position, but not vertically. The rammers may have scoops attached when operating on earth, so as to throw it sideways for removal.

WILLIAM PIDDING, of the Strand, gentleman. *Improvements in the treatment of oleaginous, fatty, or gelatinous substances for purifying, decolorizing, compounding, or clarifying the same.* Patent dated February 12, 1853. (No. 377.)

The first of these improvements consists in manufacturing soap by first distilling oils, so as to convert them into fat acids, and then subjecting them to the action of a carbonated alkali, and subsequently adding a sufficient quantity of caustic alkali to fit them for use. The fat acids on which the patentee operates are produced by boiling oils or fats with metallic oxides, and then decomposing with a cheap acid.

The second improvement consists in clarifying or bleaching oils by passing them through filtering beds containing pure alumina; for example, through a bed of hydrate of alumina mixed with gums, or other substances, which render it less dense than usual.

The third improvement consists in producing "mosaic" soap by combining variously coloured and shaped pieces of soap into cakes. To preserve their scent these may be coated with gelatine, varnish, or collodium.

CHARLES HADLEY, of Lower Hurst-street, Birmingham. *Improvements in the means of communication between the passengers, guard, and driver of a railway train, parts of which improvements are applicable to communicating on vessels.* Patent dated February 12, 1853. (No. 378.)

This invention consists in certain new arrangements of speaking tubes fitted to the carriage of a train, or on board ship, as required.

WILLIAM EDWARD NEWTON, of Chan-

cery-lane, Middlesex, civil engineer. *Improvements in apparatus to be employed for veneering surfaces.* (A communication.) Patent dated February 14, 1853. (No. 379.)

The patentee describes and claims a method of pressing veneers upon the surface to be covered by means of a fluid acting on a flexible substance interposed between it and the surface. The flexible substance is attached to and makes part of a vessel containing the fluid, by means of which the pressure becomes self-adopting to all forms, being equal, or nearly equal, on every part of the veneer, irrespective of the configuration. And also a method of using the fluid in a heated state, for the purpose of "keeping the glue warm when the pressure is first applied, so that it (the glue) may run freely and spread evenly over the surface under the action of the pressure, and then hasten the drying while the pressure is continued."

CHARLES JOHN BURNETT, of Edinburgh, Scotland, gentleman. *Certain improvements in apparatus or mechanism for driving machinery through the agency of water.* Patent dated February 14, 1853. (No. 380.)

The object of this invention is to substitute a screw, or an instrument resembling a screw, in machines driven by water-power for ordinary water-wheels.

Claim.—The adaptation and application of oblique or curved vanes or blades attached to fixed shafts or axes, in such manner as that water may act on the surfaces of the vanes or blades in an oblique direction, just as in the case of the screw propeller, the vanes or blades are made to act upon the water.

PETER ARMAND LE COMTE DE FONTAINEMOREAU, of South-street, Finsbury, London. *Improvements in treating fibrous substances.* (A communication.) Patent dated February 14, 1853. (No. 381.)

This invention consists in drying fibrous substances so as to produce their absolute and complete desiccation, and the dilatation and expansion of their fibres, by means of a current of air heated to a high temperature, which may be obtained from any suitable caloric generator heated by the combustion of either solid, liquid, or gaseous matter. Part of the moisture contained in the air is first separated from it by compelling it to pass through substances or chemical compounds, having a strong affinity for water, such as lime, chloride of calcium, &c,

PETER ARMAND LE COMTE DE FONTAINEMOREAU, of South-street, Finsbury, London. *Improvements in the mode of giving flexibility to beds, sofas, seats, and other similar articles.* (A communication.) Patent dated February 14, 1853. (No. 382.)

The patentee describes and claims an arrangement of a series of spiral springs in one or two moveable frames in such manner as that the whole forms a spring mattress for beds, sofas, chairs, and other similar articles.

FRANCIS CLARK MOUATIS, builder, of South-street, Finsbury, London. *An improved mode of raising water.* Patent dated February 14, 1853. (No. 385.)

This invention has reference to a mode of combining tubes and pistons, at distances not exceeding 30 feet, by which water can be raised by means of atmospheric pressure to any required height.

WILLIAM CLARK, of Chancery-lane, Middlesex. *Improvements in the manufacture of colours and paints.* (A communication.) Patent dated February 15, 1853. (No. 387.)

The object of these improvements is to produce colours and paints less subject to the injurious action of the atmosphere and gases in general.

The principal substance employed by the patentee as a basis is oxide of zinc, which is combined and treated with other materials according to the colour that is to be produced. The methods of preparing the following colours are described: chromes, citron or lemon, cadmium-yellow, red, orange, and green; all these are adapted to oil painting, dyeing, paper-staining, &c., and are employed in the same manner as ordinary colours.

As an example we subjoin the method of preparing chromes. *Dark chrome.* One hundred and twelve pounds of bichromate of potass are placed in a copper over a suitable furnace, and melted and brought to the boiling point. Seventy pounds of the oxide of zinc are then thoroughly mixed with thirty-five gallons of water in a separate vessel, and then the mixture is added to the bichromate of potass, and the whole boiled, and stirred for one hour. The contents of the copper are then placed in a tub in which there are several spigot-holes at different heights, and after the mixture has stood for some time the colouring matter will have precipitated itself to the bottom of the tub; the upper spigot-hole is then opened, and the superior portion of the liquor allowed to run off: subsequently the next lower hole is opened, and so on until the colouring matter is left of a pasty consistence at the bottom. To this clean water is then added, and well mixed with it, to remove any remaining acid traces; and then the result of a second precipitation is treated in the same manner with water, and so on until the whole of the acid is certainly removed. The chrome or colouring matter thus obtained is next to be desiccated, for which purpose it is removed from the tub and divided into

small masses and disposed on suitable shelves or trays (either perforated or formed of basket-work), in a drying-room, the air in which is heated to about 100° Fahrenheit, where it is allowed to remain until all the moisture is evaporated from it, when it is fit for use. For chromes of lighter shades greater portions of oxide of zinc are employed.

JOHN BETHELL, of 8, Parliament-street, Westminster, gentleman. *Improvements in obtaining copper and zinc from their ores.* (A communication.) Patent dated February 15, 1853. (No. 388.)

The following are the processes of the patentee. Having had the ore reduced to fine powder, he mixes together several portions of it with certain quantities of any sulphuretted ore. This mixture he then slowly roasts in a common reverberatory furnace, a free current of air being allowed to pass over it, the flame being hindered from coming in contact with the ore itself.

During the roasting, which will last for about two or three hours, the ore is frequently stirred about, the heat being not allowed to become great enough to sublime the sulphur in the ores. After this, about twenty per cent. of small coal, and a little sulphuretted ore, are to be added, and the whole mixed well together, and repeatedly roasted in the open air. The mixture is then drawn into a wood or stone cistern, and has about four parts of boiling sea-water stirred with it. This water is to dissolve the sulphate of copper that has been formed by the roasting. The solution is then removed to another cistern, and mixed with as much slaked lime as will be sufficient to combine with the acids, and the copper will be precipitated as an oxide, from which the metal can be obtained by the ordinary process.

Claim.—The obtaining of copper and zinc from their ores, as above described.

BENJAMIN GREENING, of Manchester, Lancaster, wire-worker. *Improvements in machinery for making fences and other similar articles of wire.* Patent dated February 15, 1853. (No. 390.)

The inventor describes a machine to be employed in the manufacture of the articles mentioned in the title, which are usually made by hand. The wires forming the longitudinal portion of the fence are placed on reels supported on arms, which are hinged to a cross-shaft placed near the floor, at the front of the machine. Each of the wires is guided under and over pulleys, by which means it is straightened. It is then passed through certain tubes supported on suitable bearings, to which tubes are affixed brackets containing bobbins carrying the wrapping or binding wires, which connect the principal wires at the points where they cross each other. The machine is driven by means of a bevel wheel attached to a driving-shaft. Several modifications of the above are described.

GEORGE STIFF, of Brixton-hill, Surrey, gentleman. *Improvements in manufacturing paper.* Patent dated February 15, 1853. (No. 393.)

These improvements relate to the manufacture of paper from straw, grass, gunney bagging, hemp bagging, and other similar materials. The process is as follows:—The materials are first cut into short lengths of half an inch, or thereabouts, by means of a chaff-cutting machine, and then winnowed to separate the knots and other impurities. They are next boiled in pure water, for from one to two hours, in a boiler or other vessel, and after the water has been strained off are immersed in lime-water for from 20 to 24 hours. The lime-water is then drained off, and a fresh solution added, and this is continued for about three days; after which the materials are steeped in an alkaline solution, on removal from which they are washed in clean water and bleached by any known means. When the bleaching process has been carried on long enough they are again washed, and then reduced to pulp, or half stuff, in the manner ordinarily followed for such purpose.

Claim.—The substitution of lime-water for other alkaline solutions employed in the maceration of straw, grass, or other vegetable fibre, or gunney bagging, or hemp bagging used to form pulp or half stuff in the manufacture of paper from such materials.

ADOLPHE NICOLE, of Dean-street, Soho-square. *Improvements in rotary engines.* Patent dated February 15th, 1853. (No. 394.)

The rotary engines described under this patent are constructed of an external fixed cylinder, and an internal cylindrical piston revolving eccentrically within it, so as to leave always a lunate-shaped space for the steam or other motive agent to act in. The novelty consists in mounting the inner cylinder on a crank or eccentric, so that it does not at any time turn round, but has a vibrating or semi-rotary motion. The steam-stop or abutment is fixed inside the outer cylinder, and a recess is formed in the cylindrical piston to receive the stop, and allow the piston to work freely. The steam ports, which can be used indifferently as inlet or outlet, are on the opposite sides of the steam-stop.

Claim.—The combination of parts described.

ALPHONSE RENE LE MIRE DE NORMANDY, of Judd-street, Middlesex. *Im-*

provements in the manufacture of articles made of gutta percha. (Partly a communication.) Patent dated February 15, 1853. (No. 395.)

In carrying out these improvements the patentee takes gutta percha and kneads it in hot water in the usual way; he then dissolves it in some volatile solvent, such as bisulphuret of carbon, benzole, &c., and filters the solution through animal charcoal, so as to obtain it as pure as possible. He then evaporates the spirit, and brings the solution to any requisite consistency, or to dryness, if required. When in a state of solution it may be used for producing various articles in which it is required to be in thin films, by putting a certain quantity into a glass vessel, and turning this about until the whole of its interior surface is covered; then, on evaporating the solvent, a thin film of gutta percha will be the result, possessing the same configuration as the interior of the glass vessel. Sheets may be produced by cutting up cylindrical forms produced in this manner, and flattening them.

Claims.—1. Decolorizing gutta percha by means of animal charcoal.

2. The manufacture of films or layers of gutta percha, as explained.

William Blissett Whitton, and George Samuel Whitton, of 18, Princes-street, Lambeth, Surrey. *Improvements in the manufacture of sewer and other pipes.* Patent dated February 15, 1853. (No. 396.)

This invention relates to that class of pipes which are formed by forcing clay or other plastic material through moulding dies (particularly to such of these as are of large diameter), and consists in making the dies in such manner that around the main core there are a number of small ones, by which longitudinal openings through the sides of such pipes are produced. By this means the pipes are supposed by the inventors to burn and dry more effectually. The claim embraces the above described method of making pipes.

Joseph and Alfred Ridsdale, of the Minories, London, engineers. *Improvements in ships' side lights, scuttles, or ports.* Patent dated February 15, 1853. (No. 397.)

This invention consists in so forming side lights, scuttles, or ports which open inwards, that when they are partially open for ventilation or otherwise, the currents of air will enter at the upper part only, while the admission of water is greatly lessened by means of cheeks, guards, or boxings projecting from the framing to which the port is hinged, the edges of the port being packed (and the hinge-joints also, if necessary), with cork or other suitable material.

COMPLETE SPECIFICATION FILED WITH APPLICATION.

Charles Frederick Stansbury, of Pall-mall, Middlesex. *Certain improvements in machinery for tempering clay, and pressing or converting it into bricks.* Patent dated August 3, 1853. (No. 1814.)

These improvements have reference to the construction and employment of a new brick press, and have for their object the attainment of greater simplicity and durability than usual, especially in those parts of it which move the mould-charger.

Claims.—1. The substitution for the shaft with the reversing gear of a shaft which continues in motion for moving the mould-carriage, the intervals of rest being produced by means of a crank-pin acting alternately upon studs and connected with the carriage.

2. The use, in combination with a piston and lever, of a slot in the lever, slotted bearings, a moveable fulcrum-pin, a connecting fork and hand lever, for the purpose of increasing or diminishingthe amount of pressure of the piston on the clay in the mould.

ENGLISH SPECIFICATION ENROLLED.

Pierre Isidor David, of Paris, machinist. *Certain improvements in the method of bleaching, and in the apparatus connected therewith.* Patent dated February 5, 1853.

These improvements are applicable chiefly to cotton in the raw state, and when manufactured into threads or yarns. After being exposed to steam, and when necessary ammoniacal gas for a short time, the cotton threads or yarns, either in hanks or spools, are placed in cages or gratings, and exposed in covered vessels to the action of chlorine gas produced by mixing sulphuric acid slowly with chloride of lime solution, and purified by passing through water and sulphuric acid. When bleached, which will result as soon as the chlorine gas has completely filled the vessel in which the yarns are deposited, the supply of gas is cut off, and that contained in the vessel drawn away by means of an air-pump, or other exhausting apparatus, communication being meanwhile opened to a vessel containing liquid ammonia, for the purpose of neutralizing any chlorine or hydrochloric acid adhering to the goods. Air is then admitted to the vessel, and the goods after wards exposed to steam and ammoniacal gas to complete the operation.

Claims.—1. The method of bleaching by chlorine gas, above described.

2. The apparatus described for effecting the said object.

PROVISIONAL PROTECTIONS.

Dated April 26, 1853.

1000. John Coope Haddan, of Chelsea, Middlesex, civil engineer. Improvements in the manufacture of cartridges, and of wads or wadding for fire-arms.

Dated May 21, 1853.

1260. Henri Joseph Scoutetten, of Metz, France. An improved plastic compound applicable to various ornamental and useful purposes.

Dated June 6, 1853.

1388. John Walter Friend, of Canute-road, Southampton. An improved method of measuring and registering the distance run by ships and boats proceeding through the water, which is also applicable to measuring and registering tides and currents.

Dated June 7, 1853.

1399. Alexander McDougall, of Manchester, Lancaster, manufacturing chemist. Improvements in the manufacture of potash and soda-ash.

Dated June 17, 1853.

1480. James Hogg, junior, of Nicolson-street, Edinburgh, publisher. Improvements in the application and combination of glass, porcelain, stoneware, earthenware, terra cotta, composition in plaster of the kind called scagliola, and majolica ware.

Dated July 14, 1853.

1672. William Henderson, of Bow-common, Middlesex, manufacturing chemist. Improvements in the construction of furnaces for the purpose of obtaining products from ores.

Dated July 18, 1853.

1708. Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, London, and Rue de l'Echiquier, Paris. A new mode of equilibrating indefinitely the weight of atmospheres. A communication.

Dated July 25, 1853.

1742. Joseph Bennett Howell, of Sheffield, York, steel-manufacturer, and William Jamieson, of Ashton-under-Lyne, Lancaster, machinist. An improvement or improvements in the manufacture of saws.

Dated July 26, 1853.

1753. John Dawson, of Linlithgow, Scotland, distiller. A new instrument or apparatus for the purpose of preventing fraud in drawing off liquids.

Dated July 27, 1853.

1765. John Knowles, of Manchester, manager. Certain improvements in looms for weaving.

1767. Ange Louis du Temple de Beaujeu, of Paris, France, gentleman. Improvements in rotatory engines.

Dated July 28, 1853.

1769. Charles Cummins, of Leadenhall-street, London, chronometer-maker. Improving clock escapements.

1771. Thomas Forster, of Streatham, Surrey. Improvements in the manufacture of boots and shoes.

Dated July 29, 1853.

1773. Theodore Dethier, of Pimlico, Middlesex, cabinet-maker. An improved machine for mortising, drilling, and boring.

1774. Griffith Jarrett, London. Improvements in machinery or apparatus for stamping or printing coloured surfaces.

1775. James Edward McConnell, of Wolverton, Buckingham, civil engineer. Improvements in steam engines and boilers for marine purposes.

1776. James Mackay, of Aigburth, near Liverpool, Lancaster, merchant. Improved apparatus for propelling vessels.

1777. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improvements in depositing metals or alloys of metals. A communication.

1778. William Wild, of Salford, Lancaster, iron-moulder. Improvements in machinery or apparatus for covering rollers used in the manufacture of cotton and other textile materials, with leather, cloth, or other substances.

Dated July 30, 1853.

1779. William Thomas Henley, of St. John-street-road, London, telegraph engineer. Improvements in modes of protecting wires for telegraphs.

1780. George Katz Douglas, of Chester, engineer. Certain improvements in the permanent way of railways.

1781. William Woods Cook, of Bolton, Lancaster, muslin-manufacturer. Improvements in the manufacture of woven fabrics, and in the apparatus employed therein.

1782. George Ambler, of Settle, York, mechanist. Certain improvements in machinery for preparing for spinning cotton, wool, and other fibrous substances.

1783. Patrick Ramsay, of Glasgow, Lanark, North Britain, waterproof cloth-maker. Improvements in the construction of tents.

1785. Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, London, and Rue de l'Echiquier, Paris. An improved mode of producing an electric current. A communication.

Dated August 1, 1853.

1786. John Buchanan, of Leamington Priors, Warwick, gentleman. Improvements in propelling vessels.

1787. Henry Cadell, of Dalkeith, Scotland, mining engineer. A reaping-machine.

1790. John Gray, of Rotherhithe, Surrey, engineer. Improved apparatus for consuming smoke.

1791. Philipp Schafer and Frederick Schafer, of Brewer-street, Middlesex, manufacturers. An improvement in travelling-bags.

1792. James Pudney Tracy, of Salisbury, Wilts, and John Hart Tracy, of Old-street, Middlesex, engineer. Improvements in cutting, reaping, and gathering-machines.

1793. John Shae Perring, of Bury, Lancaster, civil engineer. Improvements in the permanent way of railways.

1795. Augustus Russell Pope, of Massachusetts, United States. A new and useful or improved electro-magnetic alarm apparatus, to be applied to a door, or window, or both, of a dwelling-house or other building, for the purpose of giving an alarm in case of an attempt to open said door or window.

1796. Robert Griffiths, of Mornington-road, Regent's-park, Middlesex. Improvements in the manufacture of rivets and bolts.

1797. Charles May, of Great George-street, Westminster. Improvements in the manufacture of bricks.

1798. Richard Holme, of Kingston-upon-Hull, gas engineer. Improvements in the manufacture of gas.

1799. Henry Purser Vaile, of Claydon Farm, Ashchurch, near Tewkesbury, farmer. Improvements in reaping-machinery.

Dated August 2, 1853.

1800. John Bothams, of Gravesend, Kent, gentleman. Improvements in the manufacture of wheel-tyres for locomotive engines and other carriages.

1802. William Perks, junior, of Birmingham, Warwick, glass and lead merchant. A new or improved tap for drawing off liquids.

1806. Peter Armand Lecomte de Fontainemo-

reau, of South-street, Finsbury, London, and Rue de l'Echiquier, Paris. An improved mode of regulating the electric light. A communication.

PATENT APPLIED FOR WITH COMPLETE SPECIFICATION.

1814. Charles Frederick Stansbury, of Pall-mall, Middlesex. Certain improvements in machinery for tempering clay, and pressing or converting it into bricks. A communication. August 3.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," August* 12*th*, 1853.)

556. Baldwin Fulford Weatherdon and Charles Dealtry, Esq. Improvements in the construction of certain floating vessels, and in the mode of propelling them.

588. James Veevers and Henry Ashworth. Certain improvements in machinery or apparatus to be employed in the preparing of cotton and other fibrous materials for spinning.

606. Frederick William Campin. An instrument for measuring the steerage way of vessels and the rapidity of currents of water and air, applicable to ventilating ships and railway carriages. A communication.

642. William Morgan. The manufacture of a portable double-action folding chair.

665. Paul Cameron. Improvements in marine and surveying-compasses.

(*From the "London Gazette," August* 16*th*, 1853.)

625. Nicholas Auguste Eugène Millon and Leopold Mouren. Certain improvements in the treatment of corn and other grains, and more especially in all that concerns washing, drying, grinding, curing, and preserving them.

682. Henry Bousquet. Improvements in the manufacture of manure.

687. James Fraser. Improvements in the manufacture of portable packages.

699. Thomas Bouch. Improvements in signals.

708. Bernard Boyle. A centripetal flange.

709. Hesketh Hughes and William Thomas Denham. Improvements in pianofortes, organs, seraphines, and other like musical instruments,

733. George Oakes Asbury. An improvement or improvements in the manufacture of dowls used in joinery.

743. James Webley. Improvements in the construction of repeating or revolving and other pistols and fire-arms.

833. William Morgan. Improvements in paper and cardboard-cutting machines.

882. Eliza Cunnington. Improvements in the decoration of furniture, panels, and other surfaces.

904. Joseph Adamson. Improvements in flushing-apparatus and in water-closets.

923. Henry Wilks. Improvements in cocks.

933. William McNaughton. Improvements in printing yarns or worsteds for weaving carpets, also in printing carpets, woollen, silk, cotton, and other textile fabrics or fibrous substances.

1000. John Coope Haddan. Improvements in the manufacture of cartridges, and of wads or wadding for fire-arms.

1015. William Johnson. Improvements in machinery or apparatus for marking, ruling, or ornamenting surfaces. A communication.

1047. Oliver P. Drake. A new or improved apparatus for vaporizing benzole or other suitable volatile hydrocarbon, and mixing it with atmospheric air, so that the mixture may be burnt for the purposes of illumination or otherwise.

1122. William Longmaid and John Longmaid. Improvements in treating waste products obtained in smelting, and otherwise treating ores and minerals, and in producing a valuable product or products therefrom.

1151. John Henry Johnson. Improvements in machinery or apparatus for effecting agricultural operations. A communication.

1156. Marie Pierre Ferdinand Mazier. A machine for cutting and reaping corn, corn crops, and other plants.

1260. Henri Joseph Scoutetten. An improved plastic compound, applicable to various ornamental and useful purposes.

1301. John Nurse. Improved mechanism for fastening and unfastening doors, applicable especially to the doors of carriages.

1437. William G. Craig. Improvements in axle-boxes, guides, and bearings of locomotive engines and carriages, parts of which improvements are applicable to the bushes and bearings of machinery.

1480. James Hogg, junior. Improvements in the application and combination of glass, porcelain, stoneware, earthenware, terra cotta, composition in plaster of the kind called scagliola, and majolica ware.

1561. Auguste Edouard Loradoux Bellford. Improvements in steam boilers. A communication.

1613. Thomas William Kennard. Improvements in iron bridges.

1672. William Henderson. Improvements in the construction of furnaces for the purpose of obtaining products from ores.

1707. William Boggett and William Smith. Improvements in machines for cleaning and polishing knives.

1708. Peter Armand Lecomte de Fontainemoreau. A new mode of equilibrating indefinitely the weight of atmospheres. A communication.

1713. Richard Dart and Edward Silverwood. The adaptation of loom machinery to the purposes of embroidery for badges worn by the police, railway officials, and other officers, and which require a succession of figures.

1731. Thomas Gray and John Reid. An improved mode of manufacturing files and rasps.

1733. George Spencer. Improvements in springs for carriages.

1736. William Huntley. Improvements in engines to be worked by steam, air, or fluids.

1738. Frederic Warner and John Lee. Improvements in water-closets and urinals.

1740. James Murdoch Napier. Improvements in letter-press and other raised surface printing-machines.

1744. Alexander Clark. Improvements in regulating the speed and indicating the power of steam and other motive-power engines.

1745. William Ireland. Improvements in the mode or method of melting or fusing iron or other metals, and in the apparatus employed therein.

1747. Robert Bitten. Improvements in apparatus for ascertaining and indicating the supply of water in steam boilers.

1748. Warren de la Rue. Means of treating and preparing certain tar or naphtha, and applying products thereof.

1749. John Ferguson. Improvements in kilns for baking or burning clay.

1751. William Edward Newton. Improved machinery or apparatus for stopping cables. A communication.

1764. Francis Arding. Improvements in threshing-machines.

1771. Thomas Forster. Improvements in the manufacture of boots and shoes.

1772. Benjamin Collins Brodie, junior. Improvements in treating or preparing black lead.

1775. James Edward McConnell. Improvements in steam engines and boilers for marine purposes.

1776. James Mackay. Improved apparatus for propelling vessels.

1779. William Thomas Henley. Improvements in modes of protecting wires for telegraphs.

1790. John Gray. Improved apparatus for consuming smoke.

1796. Robert Griffiths. Improvements in the manufacture of rivets and bolts.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed August 12, 1853.

1853:

378. Charles Hadley.
382. Peter Armand Lecomte de Fontainemoreau.
385. Francis Clark Mouatia.
387. William Clark.
1504. William Hodgson and Henry Hodgson.

Sealed August 15, 1853.

394. Adolphe Nicole.

Sealed August 16, 1853.

413. James Murphy.
426. William Darling.
455. John Smith.
462. Adam Cyrus Engert.
514. John McAdams.
824. James Jerram Pratt.
1463. James William Gibson.
1465. Joseph Ilsley.
1497. Samuel Schofield.
1551. Alfred Sandoz.
1589. John Jaques the younger.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1568.] SATURDAY, AUGUST 27, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

SHEPPARD'S PATENT AIR-HEATING APPARATUS.

Fig. 2.

SHEPPARD'S PATENT AIR-HEATING APPARATUS.

(Patent dated February 16, 1853.)

The arrangement described under this patent is intended to be employed for heating air for blast purposes, such as the smelting of iron ore and other minerals and metals, and from its general simplicity and undoubted efficacy, is well deserving the attention of our iron-masters and others interested in this branch of manufacturing industry. The ordinary mode of heating air for such purposes, consists in passing it through single pipes heated exteriorly, an arrangement which is not found in practice to answer the purpose so effectually as is desirable. Mr. Sheppard, however, proposes to construct his heating-apparatus so that the air shall be caused to traverse annular spaces between two or more pipes, to which heat is applied both exteriorly and interiorly, whereby the air is heated more rapidly, and consequently with a less expenditure of fuel, in obtaining a given temperature. In the construction of his stoves and apparatus, he generally employs two or more pipes placed one within the other, their diameters being such as to leave a vacant space between them; and he causes the flame and products of combustion from the fire to pass up the interior of the inner pipe, while the exterior of the outer pipe is also exposed to the direct heat of the fire, so that the air in passing through the space between the pipes thus heated, becomes heated also. The dimensions of the pipes may vary, but it has been found that two pipes of 5 inches and 10½ inches diameter respectively, answer the purpose very efficiently. This leaves a clear space of 2 inches between the pipes, and in order still further to increase the heating surface, a spiral flange or rib may be cast on the exterior of the inner pipe. By these arrangements a great saving is effected in the fuel required for heating the air, and a more powerful and uniform heat is obtained, with less liability to leakage than at present exists, while the first cost of construction is reduced, and the expense for repairs rendered of much less amount than is usual.

Fig. 1 of the accompanying engravings is a vertical section, and fig. 2 a plan of Mr. Sheppard's stove and apparatus for heating air. A A are the exterior walls; B B the fire-places, divided from each other by the brick walls, C C. D D are wall-plates on the walls, C C, in which the lower ends of the heating-pipes, E E, and G G, are supported and made air-tight by a luting of fire-clay or cement. The heating-pipes are placed vertically in two rows of six (or more) in a row, and the alternate ones of each row communicate with the blast-pipe of the blowing-engine by the pipe, H H, through which the cold air is introduced to the spaces, I I, between the pipes. The outer pipes, E E, are cast two together, and these two communicate by an aperture, Z, through which the air passes from one to the other, as shown in the detached sectional plan and elevation, figs. 3 and 4. F F are spiral flanges cast on the exterior of the inner pipes, G G, for increasing their heating surface. K K is the hot air-pipe leading to the blast-furnace or furnaces, and communicating with the air-spaces, I I, of the other alternate heating-pipes by branch-pipes, *k k*. L L are fire-brick coverings to the fire-places, above which are placed layers of sand or ashes, to retain the heat as much as possible. The heat from the fire-places acts directly on the exterior of the pipes, E E, and also on the interior of the pipes, G G. The air enters the spaces, I I, of the alternate pipes, and being heated in traversing them, passes into the air spaces of the next adjoining pipes, and thence to the hot-air pipe, K K, through the branch-pipes, *k k*. The hot-air pipe, K K, communicates with the blast-furnace in the usual way. Instead of arranging the heating-pipes in two rows, Mr. Sheppard suggests that they might all be placed in one row, the cold air being caused to enter the alternate pipes, and to pass to the next adjoining ones, and from thence to the hot-air pipe.

PRELLER'S PATENT LEATHER.

In No. 1548 we gave a detailed account of a patented process for the conversion of the hides and skins of animals into leather, which was being worked with complete success by Mr. Charles Preller, at Lant-street, Southwark. The time which has elapsed sinced the period of our first visit to his establishment has yielded fresh proofs of the valuable properties of the material produced under the patent, with reference to many objects of importance in the arts; and it has also afforded to experimentalists the opportunity for discovering its susceptibility of adaptation to purposes which leather, tanned in the ordinary manner, answers very imperfectly. Referring to the

Number of the *Mechanic's Magazine* mentioned above for information on the details of the process, and the general nature and application of the resulting products, so far as they were at this time understood, we purpose now to recapitulate very briefly the leading points to which we then called attention, and to point out in passing what has since been accomplished in the application of this new material to such purposes as appear worthy of being known.

Preller's "BH Crown" leather is made by acting upon the hides and skins, when they have undergone the usual preparatory operations, until a composition, consisting of a variety of animal and vegetable substances, among which barley-meal, oatmeal, or rice-meal (each of which is found to contain a large proportion of starch, and only a small one of gluten), is the predominant ingredient. A viscid paste, formed by intimately mixing these substances, is covered over the hides, which are then put into large hollow cylinders supplied with hot air, and driven round on their axes by steam power. By means of a number of pegs, fixed firmly on the inner sides of the circumference of the drums, their rotary motion kneads the hides well together, and in a few hours causes them to absorb uniformly the composition which has been placed upon them. They are then taken out, more composition is put upon them, and the revolving process repeated for a second, and, if necessary, for a third time. The chemical combination of the gelatine of the hides under the converting composition having been effected, they are hung up to dry, and in that state become ready for currying and dressing. Thus in two or three days a hide can be converted into leather, while the tanning process would take as many years to do; and it acquires properties useful in every case where leather is employed, which that process does not and cannot confer. In judging of the value of leather thus made, new criteria for estimating the relative qualities of different specimens of leather must be estimated,—and this has, to a great extent, been done already; and the natural operation of circumstances, since the new leather has become known. As a general rule it has been usual hitherto to judge of leather by its weight; but if the same strength can be had with a less weight and substance, there appears to be no reason why weight should be adhered to as the criterion to go by. Tanners are interested in producing heavy leather; and if one system of tanning produces a heavier leather than another under given circumstances, it is considered superior to it. The qualities by which the patent leather recommends itself, however, are its extreme pliability, its lightness, its strength, and its durability, together with the advantages incidental to the simplicity and rapidity of the converting process. With regard to the strength which it possesses, we took occasion, when first noticing the subject, to state a few facts which prove that it approximates far more nearly to the strength of the raw hide than the common leather does; that its insolubility in water is perfect; and that its pliability is due partly to the smaller thickness which it presents, and partly to the absence of any foreign and uncombined substances in the animal tissue when it has been operated upon. Its durability would naturally result from these qualities, and on a large scale would be highly conducive to economy.

Of the numerous applications which have hitherto been made of this new leather, the most extensive, if not the most important, is the construction of driving-bands for machinery. Its smaller thickness and greater pliability enable it to adapt itself more easily and more accurately to the portion of the curved surface of the pulley with which it is in contact, and no portion of the moving force imparted to the band is neutralized in the effort to overcome rigidity. Every day's experience proves its great value for this important purpose. At a large establishment in Yorkshire, where wide driving-bands of Preller's leather are employed, it is found that the machinery will do as much work, with one-third less power, as when oak-tanned leather bands were used; and at Kidd's flour-mills at Isleworth, in which four pairs of stones are driven by one of Preller's bands, the gauge indicates only 5 inches working power, whereas with the old band it was constantly 7 inches. These are two examples among several to which our attention has been drawn, but they must be regarded as showing the general character of the results which have been obtained in every situation where a trial has been made. The extent, moreover, to which they are coming into use in every part of the kingdom, for driving machinery of all magnitudes, confers upon the article the stamp of successful practice; and considering the shortness of the time in which they have displaced the old bands, proves them to possess remarkable advantages for this particular purpose.

Among other uses in which the leather had been found to work well, we mentioned that the "picks" of looms, or small leathern loops from 8½ to 10 inches in length, attached to the shuttle. Its great lightness, pliability, and strength, are admirably suited to the requirements of this portion of the loom; and so much esteemed are those

made from the "Crown" leather, that whereas the general prices of the article are 1s. 8d., these fetch 1s. 8d., and 2s. 6d.

Experiments made with Preller's leather show conclusively that it is well fitted for the operation of enamelling. We have seen a very beautiful specimen of an enamelled skin treated by this process, the pliability of which still remained so perfect that no amount of crumpling will disfigure in any manner the highly brilliant surface which it had assumed. An enameller of leather on a very extensive scale, who has been trying it with reference to this particular purpose, has succeeded with ease in overcoming the difficulty which the fatty matters present usually occasion, and speaks highly of its general capabilities in enamelling. A very fine specimen was also showed us of a goat's skin which had been completely converted without removing the hair. For warm winter shoes, and coverings of various kinds, this promises to be the foundation of a very extensive manufacture.

The only other point in connection with this interesting and important subject which we need allude to at present, is the use of the leather in making boots and shoes. In the upper works of these articles it was found from the first to answer extremely well, but it was doubted for some time whether, considering its peculiar characteristics, it would be suitable for the soles. The experiment has now been tried with the best results; and it appears, that while its pliability and softness render boots and shoes made from it the most delightful wear imaginable, its durability is just twice that of ordinary sole leather. Two pairs of boots were made by the same maker in the most substantial manner, one with the common leather, and the other with Preller's. They were subjected as nearly as possible to equal wear; and the consequence was, that the ordinary leather sole was replaced by a new one, which was very much worn before the other exhibited symptoms of giving way.

Such are the general state and prospects of this remarkable manufacture. As we have observed more than once before, it has occasioned no little sensation in the manufacturing communities; and judging from the rapidity with which it has made its way in opposition to the prejudice which usually attend the introduction of new methods, we cannot but think it must work before long a complete revolution in the process upon which it has made such bold innovations. In the meanwhile we are in possession of an article of the most exclusive use, which has been so much improved upon in its nature and qualities, as to bring to the artizan all the advantage of a new appliance; and it is not too much to expect that secondary beneficial consequences will follow from this cause, which will tend materially to promote the prosperity of the arts of life.

NEW YORK EXHIBITION.

If we have made reference to the American Crystal Palace but once before, it is not because of any want of interest in so great a demonstration. We who endeavour to sustain the reputation, now so long enjoyed, of being the Magazine for British Mechanics, could not possibly feel any disregard for this Exhibition, which, perhaps, of all others one might expect to be of the highest interest to our readers. We say, of all others, because America, while consenting to her inferiority in elegance and display to the southern countries of the Continent, and to Britain in the perfection of the industrial arts, claims for herself an indisputable pre-eminence in the achievements of mechanical discovery. We have received periodical reports both of the progress of the Palace itself to the time of its opening and of the gradual accumulation of objects for exhibition; nor are we without sufficiently elaborate accounts of the splendid ceremony of inauguration. But we have presented none of these to our readers, for the following reasons.

The journals of America and their reports are, as a general rule, far too lofty, far too *splendiferous* for us, and, we think, for our readers also. When we see a building rising in which the inventions of thoughtful and experienced men—the best products of the genius of more than one nation—are to be displayed, we are not insensible to the natural excitements of the scene; nor, when we behold the President of a great and certainly not an inglorious Republic seeking to swell by his own imperial eloquence the honour of industry, *and of the industrious*, are we without feelings for which enthusiasm itself were perhaps a term not too exalted. But it is because we thus feel that we dislike the tone of the American press. Let great objects be described carefully, and great events be recorded simply. At any rate, if the ornaments of language are to be superadded, let them be selected with taste and gracefully employed.

Again; the pens of the American journalists are too excursive. If we gave an extract which commenced with a description of, say a reaping-machine, we should very likely be compelled, for the sake of securing the conclusion, to admit some expressions of opinion as to the prowess of the people, or the genius of the Congress; or if we went to press with an account of the opening of the Palace, we should probably have to put in

type some sentiment or dissertation on the levying of *black mail*, or the incorruptible honour of all the penny-a-liners of that great country.

Now, if this be true (and who can doubt it?) it is certain that our Magazine cannot be fed from such a source, for it is a fundamental point with us, and one which we think it worth our labour to contend for, that the records of science cannot be made with too great care and exactness. And it is also our conviction, that every improvement made in the arts of life, and every discovery made in the truths of science, if properly put forth, are sufficient of themselves to command the interest and patronage of the public.

The consequence of all this is, that we must ourselves occasionally endeavour to rescue from the *quasi*-eloquence of Jonathan the thing he is trying to communicate so sublimely to us. For, in the first place, we are not foolish enough to attempt to scandalize a nation by asserting that in such an exhibition as that at New York, there is nothing that concerns English mechanics; and further, in the second place, it is our opinion that the Americans have produced, and are producing, invaluable inventions. We shall now, therefore, cease to generalize, and endeavour to compress a few introductory facts into the small remainder of the space allotted to this article.

The Palace which stands in Reservoir-square, in the north-western part of New York, has its plan in the form of a Greek cross, its extreme length being 365 feet 5 inches, the breadth of each arm of the cross 149 feet 5 inches. In these dimensions the three entrance-halls at the ends of the arms of the cross are not included. The spaces between these are taken into the body of the building, on the ground-floor, which consequently loses its cruciform character, and is made octagonal. The most striking part of the edifice is a noble dome, 100 feet in diameter and 123 feet high to the crown of the arch. The glass exterior of the building is coated with a translucent but non-transparent enamel, for the purpose of subduing the effects of the sunlight. The building is lighted with gas throughout, and water for supplying the visitors, and for use in the event of fire, is conveyed also to all parts. The plan of the building was proposed by Messrs. Carstensen and Gildemeister, and the decorations were entrusted to Henry Greenough, Esq.

Two-thirds of the interior space of the building is appropriated to foreign nations, the remaining third being reserved for the United States. The machinery is arranged in an arcade on the eastern part of the grounds, the steam for driving the working machinery being conducted by underground pipes from engines placed in a neighbouring street. The most characteristic inventions exhibited by the Americans are such as substitute mechanical for manual labour, such being naturally prolific in consequence of the comparative scarcity of the latter in the States. There are ten machines for sewing leather, exhibited by American inventors only. One of these is represented as capable of performing the same amount of work as ten women. In the Hyde-park Exhibition there were only three similar machines. The original model of Whitney's cotton gin, by which the seeds and impurities are separated from the cotton with extreme facility, is exhibited by his son.

The mineralogical and mining department is in the new part of the building, and occupies a distinct apartment. The Director, Professor B. Silliman, has endeavoured to obtain representations from every accessible mine of importance; and so to arrange the specimens that the collection will indicate geographically the mineral productions of the country. Special agents have been sent for this purpose to the mines, smelting-works, and other places, in order to obtain valuable specimens; and beside this, there have been large private contributions to the stock, and loans from home and foreign collections. Raw materials are expected to form the chief portions of the contributions from Canada, as well as from the United States.

Oil-paintings, which were excluded from the London Exhibition, are admitted to and form an interesting feature of this. From Dusseldorf sixty or seventy original pictures, chiefly prepared for the purpose, are exhibited. Seventy artists have contributed from Paris, and ten from Switzerland. Other paintings are also sent from Sardinia and Tuscany, and Prince Albert has supplied several.

"COPIES OF SPECIFICATIONS REPEAL ACT."

The following is a copy of the "Copies of Specifications Repeal Act," which received the royal assent on Saturday, August 20, 1853.

An Act to amend certain provisions of the Patent Law Amendment Act, 1852, in respect of the transmission of certified copies of letters patent and specifications to certain offices in Edinburgh and Dublin, and otherwise to amend the said Act.

Whereas it is expedient to amend certain provisions of the Patent Law Amendment Act, 1852, in respect of the transmission of certified copies of letters patent and specifi-

cations to certain offices in Edinburgh and Dublin, and otherwise to amend the said act: Be it therefore enacted by the Queen's most excellent Majesty, by and with the advice and consent of the Lords spiritual and temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

I. Section thirty-three of the said Act, and such part of section twenty-eight of the said Act as directs that in case reference is made to drawings in any specification deposited or filed under the said Act, an extra copy of such drawings should be left with such specification, shall be repealed.

II. The Commissioners shall cause true copies of all provisional specifications left at the office of the commissioners to be open to the inspection of the public at such times, after the date of the record thereof respectively, as the commissioners shall by their order from time to time direct.

III. A true copy, under the hand of the patentee or applicant, or agent of the patentee or applicant, of every specification and of every complete specification, with the drawings accompanying the same, if any, shall be left at the office of the commissioners on filing such specification or complete specification.

IV. Printed or manuscript copies or extracts, certified and sealed with the seal of the commissioners, of letters patent, specifications, disclaimers, memoranda of alterations, and all other documents recorded and filed in the commissioners' office, or in the office of the Court of Chancery appointed for the filing of specifications, shall be received in evidence in all proceedings relating to letters patent for inventions in all courts whatsoever within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, and Her Majesty's Colonies and Plantations abroad, without further proof or production of the orignals.

V. Certified copies, under the seal of the commissioners, of all specifications and complete specifications, and fac simile copies of the drawings accompanying the same, if any, disclaimers and memoranda of alterations filed or hereafter to be filed under the said Patent Law Amendment Act, shall be transmitted to the office of the Director of Chancery in Scotland and to the Enrolment Office of the Court of Chancery in Ireland within twenty-one days after the filing thereof respectively, and the same shall be filed in the office of Chancery in Scotland and Ireland respectively, and certified copies or extracts from such documents shall be furnished to all persons requiring the same, on payment of such fees as the commissioners shall direct; and such copies or extracts shall be received in evidence in all courts in Scotland and in Ireland respectively in all proceedings relating to letters patent for inventions, without further proof or production of the originals.

VI. Where letters patent have not been sealed during the continuance of the provisional protection on which the same is granted, provided the delay in such sealing has arisen from accident, and not from the neglect or wilful default of the applicant, it shall be lawful for the Lord Chancellor, if he shall think fit, to seal such letters patent at any time after the expiration of such provisional protection, whether such expiration has happened before or shall happen after the passing of this Act, and to date the sealing thereof as of any day before the expiration of such provisional protection, and also to extend the time for the filing of the specification thereon; and where the specification, in pursuance of the condition of any letters patent has not been filed within the time limited by such letters patent, provided the delay in such filing has arisen from accident, and not from the neglect or wilful default of the patentee, it shall be lawful for the Lord Chancellor, if he shall think fit, to extend the time for the filing of such specification, whether the default in such filing has happened before or shall happen after the passing of this Act: Provided always, that, except in any case that may have arisen before the passing of this Act, it shall not be lawful for the Lord Chancellor to extend the time for the sealing of any letters patent, or for the filing of any specification, beyond the period of one month.

VII. And whereas doubts have arisen whether the provision of the Patent Law Amendment Act, 1852, for the making and sealing of new letters patent for a further term, in pursuance of Her Majesty's order in council, in the cases mentioned in section forty of the said Act, extends to the making and sealing of new letters patent in the manner by such Act directed where such new letters patent are granted by way of prolongation of the term of letters patent issued before the commencement of the said Act: And whereas it is expedient that such new letters patent granted by way of prolongation shall be granted according to the provisions of the said Patent Law Amendment Act: Be it declared and enacted, That where Her Majesty's order of council for the sealing of new letters patent shall have been made after the commencement of the said Act, the said provision of the said Act for making and sealing in manner aforesaid of new letters patent shall extend, and shall, as from the commencement of the said Act, be deemed to have extended,

to the making and sealing in manner aforesaid of new letters patent for a further term as well where the original letters patent were made before as where such original letters patent have been issued since the commencement of the said Act.

VIII. This Act, and the Patent Law Amendment Act, 1852, shall be construed together as one Act.

AERIAL TRAVELLING.

To the Editor of the Mechanics' Magazine.

Sir,—The following is the title of a pamphlet, published last year, which has just fallen into my hands, on which I beg you will allow me to say a few words to my fellow-mechanics: "Thoughts on Aërial Travelling and the best means of Propelling Balloons." By James Nye.

One hardly seems to be doing justice to the intelligence and almost unlimited resources of the human race, in expressing a fear that the navigation of the air by man will never be *un fait accompli.* We are hurried along the iron roads at the rate of some forty miles per hour, by a breathing mass of iron, which, to the docility and fleetness of the race-horse, seems to add a strength almost fabulous; or we find ourselves on the deck of some wooden sea-monster, which the music of the hammer and the saw has charmed into our service, and with a few rapid strokes of his tail we are transported wherever we list. After this, to say that we can never hope to rival the condensed strength of the simple sparrow, and that the rapid evolutions of the humming-bird must for ever remain a mystery to us, argues most philosophical incredulity: so true is this that a belief in the probability of aërial navigation seems to vary directly with the extent of one's mechanical knowledge. Nearly three-quarters of a century have now elapsed since Montgolfier contrived to manufacture a cloud, and made it carry him to its lofty home; and since then, with hundreds of inventors in the field, scarce anything has been done. We can certainly go up; but when there we are completely helpless and at the mercy of the winds, thinking ourselves extremely fortunate if we have the means of getting down again without breaking our necks.

In 1843, *La Presse*, a French paper, announced that an engineer had at last invented an air balloon to be propelled by a screw with steam power; eminent engineers had pronounced it practicable, the wonder-loving public had liberally subscribed the requisite cash; and, in fact, the showman's last "tuppence" had really been received, and the donkey was to "go up." I need hardly say that it did not do so Now Mr. Nye comes before us with a new proposition. His first object is to show that birds are not supported by the motion of their wings; the chief use of which, he imagines, is to keep the bird in equilibrium while it is buoyed up by the inflation of the internal air-vessels with rarefied air. In support of this, he quotes some remarks in the "Penny Cyclopædia" on the flight of the condor vultures, the writer of which asserts, that except when rising from the ground, he does not recollect ever having seen one of these birds flap its wings: "if the bird wished to descend, the wings were for a moment collapsed, and then again expanded with an altered inclination, the momentum gained by the rapid descent seemed to urge the bird upwards with the even and steady movement of a paper kite." Any person may observe the latter phenomenon in the flight of the common gull. I have myself seen them describe a curve a hundred yards long, without once flapping their wings; they do, however, usually support themselves partially by the motion of the wings, but the only part of them which seems to be used for propulsion is the short third or outside joint of the wing-bone, called the "phalanges of the fingers." This has a rapid backward motion, as the wing is raised and depressed vertically.

Mr. Nye, therefore, closely imitating Nature, would use rarefied air as the means of supporting his proposed aërial machine. This is confined in an ordinary balloon of linen, attached at the front and back to two upright poles, from the bottom of which the car is suspended, so that any force applied to the car is communicated to the balloon by means of the poles. For a propelling power, he first suggests fixing a cannon to the framework of the car, so that "turning the hind part of the gun to the fore part of the balloon, and substituting for the ball some other innoxious material," we might fire ourselves along; but, as he says, "the loudness and suddenness of the report, to many, would be a serious objection." He therefore waives all further discussion respecting this species of arms, and suggests the use of an air-gun; but in the absence of experiments on the subject, he is compelled to dismiss this promising means of propulsion, and pass on to the Congreve rocket. He discovers that a 32-pounder Congreve will travel nearly two miles in seven seconds; he therefore proposes to fix some inexplosive ones, constructed for the purpose, as radii to a wheel attached to the car, which being turned slowly round causes the rockets to ignite successively by bringing them over a jet of gas, so that succes-

sive impulsions are given to the machine, and a high velocity is obtained. He would steer it by turning the burning rockets out of the line of motion. Let us examine the practicability of this plausible scheme. By an elaborate investigation he discovers, that to carry 5,500 lbs. weight of car, passengers, &c., at 15 miles per hour for 11 hours, it would be necessary to have a balloon 187 feet in diameter (that is, if it were spherical, and not, as he would rather suggest, of the form of the solid of least resistance), the balloon would therefore contain 3¼ millions of cubic feet of air, which he proposes to keep hot by means of a steam engine in the car; what kind of an engine he would require for this feat, and how much of his 2½ tons would be available for the carriage of passengers, after suspending a car-engine and coals, I must leave; those whom he could accommodate would have to pay well for their trip, as he would consume 5,657 lbs. of rocket composition per hour, which, with cases, would cost at least £300. But the most remarkable fact is, that the light cloud of hot air and vapour inclosed in his linen envelope is squeezed together with the power of 600 horses; and Mr. Nye seriously imagines, or forgets to suspect the contrary, that it would not be at all compressed, but would retain its calculated buoyant power. He concludes by saying, "The only reason which induced me to enter into so laborious a calculation was to ascertain if possible whether the scheme proposed was sufficiently hopeful to be made the subject of experiment, and of that I think there can be no longer any doubt." Whether you, Sir, will come to the same conclusion from the said calculations is exceedingly doubtful.

The notion seems however to be a good one; and should success in the solution of this important problem ever reward our labours, it will probably be from the employment of some such condensation of the elements of power as is found in gunpowder, or perhaps in the diamond. If chemistry should ever enable us to obtain the solid form of carbon from the gaseous (and wherefore not?) then may we hope to construct machines of which diamonds shall be the fuel, the sudden vaporising of which in a receiver shall supply us with that rush of gas, through a small aperture in it, which is so effective in the common rocket. We should in that case require no balloon at all; the rocket would be as effective to carry us upward, and maintain us at any elevation we please, as it would be to transport us horizontally; and had Mr. Nye made his calculations on such a supposition his errors would not, I think, have been so glaring. The 32-pounder Congreve, the power of which we have already discovered, would carry two, or perhaps three, men at the rate of sixty miles per hour, and supplying the place of the destructive materials with rocket composition, it would do so for 21 seconds, or through one-third of a mile: it could as easily be made to receive elevation and depression at the will of the aëronaut as lateral deviation from its course. Nor is the supposed analogy to the flight of a bird destroyed by the omission of the balloon; for however great the inflation of the air vessels, the specific gravity of the bird is *considerably* greater than that of the air. High velocities with the use of a balloon, except when drifting before the wind, are plainly out of the question; for even if hydrogen were used, possessing four times the buoyant power of Mr. Nye's hot air and vapour, it would yet require a balloon at least 16 feet in diameter to support a man of ordinary size. Experiment has shown, what common sense might long ago have dictated, that there is no analogy between sailing in the air and in the water: the problem, how to steer a balloon, is now classed by practical as well as scientific men with those ancient disturbers of the public peace, the discovery of perpetual motion, and the *elixir vitæ*.

I trust, Sir, that the importance of the subject will be a sufficient excuse for my having troubled you with so long a letter.

Yours, &c.,

N. B.

August 22, 1853.

The Conservation and Improvement of Tidal Rivers, considered principally with reference to their Tidal and Fluvial Powers. By EDWARD KILLWICK CALVER, R.N., Admiralty Surveyor. London: John Weale, 59, High Holborn. 1853.

WE think we cannot offer a better introduction of this volume than the following extract from the Author's preface:

"An extensive sphere of observation has been mentioned as the writer's warrant for treating upon the subject, and more than a passing reference might also be made to those instances where his opinions have received the sanction of experience, were the subject not personal, and the act therefore liable to be misconstrued. Many of the views are peculiar, but they are not urged in any spirit of hardy dogmatism: if they are sound, they will be useful; if otherwise they will do no harm, and will soon be forgotten.

"As the work is particularly addressed

to unprofessional readers, all unnecessary technicality, all cumbrous formulæ, and all theory not strictly applicable to the case, have been carefully avoided. Executed as a winter-evening recreation, only the more important points have been touched upon; and, keeping in view the practical end proposed, the aim has been to give more attention to the logic of facts than to the rigid fitness of a word, or to the construction of a sentence. Incompleteness must needs be a prominent feature of such a work, but it is trusted it will not be found unaccompanied in this instance with materials for thinking. The deep interest the writer takes in the subject for its own sake, may, however, have betrayed him into indiscretion, and the reader's indulgence is therefore requested for any undue earnestness of expression in this well-meant attempt to treat a 'vexed question.'"

The interest of the work thus modestly brought before us is very considerable. Although the subject of which it treats is one that has, perhaps, but a remote relation to many of our readers, still it is really of great significance, and well worthy the attention of scientific men. The inductive process of reasoning is the one adopted by the author, which, indeed, was the proper one for a person to employ whose experience had afforded such an accumulation of facts as he possesses for the purposes of a careful generalization. We are pleased to find that throughout the volume personal experience and collateral evidence are all that are made use of in the enforcement of his views. After reading the author's preface we feel that this is as it should be, and in consequence of his fidelity to the duty he had proposed to himself, he has produced a highly instructive and important work. In this respect we are happy to have his book as an example, which other practical writers would do well to imitate if they would seek to escape from those severe penalties which he deserves to bear who consents to become a charlatan in order to be esteemed a theorist. In this case we are made to feel that the writer is discoursing upon a subject on which it is both lawful and important for him to speak.

The first question discussed by Mr. Calver, and treated very successfully, is, whether the entrances of tidal rivers are or are not improved by preserving or increasing the amounts of tidal water that flow through them, rather than by diminishing them. That they *are* he contends most strongly, and brings to the confirmation of his assertion elaborate and weighty testimony, as well as corroborating facts derived from his own experience. These should, and will, doubtless, have influence with those who lack the little theoretical knowledge that would lead independently and very directly to the same conclusion.

The next step in the principles laid down by the author does not, however, so palpably appear to be a proper one; the object is to show "that a *bonâ fide* fresh-water stream is powerless to maintain a sea outlet, and to keep down a bar." One paragraph detailing one illustration is all that is adduced to prove this assertion true. The example is taken from the river Coquet, which takes its rise in the west of Northumberland, among the Thirlmoor Hills, and joins the sea just below the town of Warkworth, after traversing a channel about forty-four miles long. All that is stated about this river bearing upon the subject is, that the tidal influence only extends up it for about three and a quarter miles,—that the quantity of tidal water admitted is small,—that, owing to the necessities of the district, works of an extensive character, and involving a large outlay, were entered upon for its improvement,—and that "the writer visited the harbour several years after the works had been carried out, and their effect fully developed, when, instead of a free and unincumbered approach, as was predicted, an all but dry bar, of a horse-shoe form, extended across the entrance from pier to pier." The author then assumes that his point is proved, and passes on accordingly. Now this will not do, for two reasons; first, one example, if ever so clearly put and indisputably established, is not sufficient for the induction of a "*cardinal doctrine*;" and, second, the author has omitted altogether to inform us what were the nature and extent of the operations performed upon the unfortunate Coquet; and these we *must* know before we can form a judgment even upon this single case, and especially before we can proceed from it to important conclusions. In fact the author has strengthened us in our doubts as to the accuracy of the principle rather than otherwise; for, as we suspect that if facts could be arrayed in its support, he would undoubtedly have brought them forward, and yet he has failed even to attempt the production of more than one; and as, moreover, we see no *à priori* reason for believing that such a stream should not be sufficiently impetuous to prevent the augmentation of a bar by the scouring effect it

produces upon it when the sea level is falling, and to maintain its own oceanic outlet, therefore we are inclined still to conclude, and that even more certainly than before, that the principle advanced is not a true one.

We do not intend to push our denial at all beyond what we have stated, nor does that denial prevent us from cordially assenting to the author's first statement in the second chapter, viz., that a flood state *is not a governing state* in tidal rivers; that is, that the freshes of a river are alone insufficient, as a general rule, to preserve an unencumbered outlet, and that it is highly important to preserve as large tidal influxes as can be retained. To this we readily assent, as do we also, almost without reserve, to the whole of the arguments embraced in this second chapter; and further, we recommend the study of them to all those who are doubtful as to the effects of indents upon the tidal volume, and the nature of the depositions that occur in tidal rivers, in some cases to such an extent as to interfere seriously with their navigation, and, by this, with the commercial characters of the neighbouring towns. In the discussion of this latter subject, *deposition*, after replying to the objection "that if the ebbing waters have an excess of power over those which flow, a greater quantity of sand would be carried out than is brought in, and the depth would consequently increase;" the Author goes on to say—"Misapprehension on this point has no doubt arisen from observing that the deeper channel or gutter caused by the passage of a fresh is lost immediately the river returns to its usual volume, and this fact has been confounded with a general silting up, and accepted as an index of what would be the case were there no floods. It is not unfair perhaps to hazard an opinion, that an undue prominence given to this point lies at the root of at least one of the theories we have been considering. A little more reflection, however, would show that the apparent silting up was simply a return to the state of equilibrium disturbed by the fresh. 'Every kind of soil has a certain velocity consistent with the stability of the channel; a greater velocity enables the waters to tear it up, and a smaller velocity permits the deposition of more materials from above.' A fresh, then, by destroying the ordinary balance, results in a deepening and derangement of the bed, but the latter returns to its *mean state* again on the subsidence of the flood; the effect, in short, ceasing with the cause.

"The idea of sea deposition may also partly have arisen from observing the effect produced upon the dry sand by the flowing water. How common is the remark, 'The sand is all alive during the flood, but fixed during the ebb.' The feature which has been misinterpreted is a very marked one. If, for instance, we walk by the sea-shore during the flowing tide, though the level of the water may be several feet below, yet the sand will be found in a semifluid state, and each foot-print in a short time forms a small pool of water, whereas, with the falling water, the sand is firm, and increasingly so as the tide falls and filters from it. This phenomenon results from capillary attraction, whereby, in porous substances, water is enabled to rise above its own level; but after the sand is once covered, the attraction necessarily ceases, and the sand is acted upon by the forces imparted to the water, *entirely irrespective of its belonging to the flood or the ebb.*

"There are several other theories of river treatment of a minor order which cannot be noticed in a brief work like the present. The errors characterising those we have discussed arise chiefly from extending the laws of running water over the tidal stream without sufficient warrant; then to a neglect of physical truths, about which there can be no doubt, and which are therefore the best exponents of laws yet to be discovered, but which, from their nature, are independent of the common operations of the experimentalist."

We have not space to lead our readers through the remaining sections of the work. We cannot, however, refrain from expressing our sense of the great value of Mr. Calver's remarks on the improvements of rivers. In these a considerable display of valuable knowledge and prudent counsel will be seen, and altogether the question is treated with great skill. The following are his closing remarks upon this portion of his subject; we make room for them, because they present a brief epitome of the conclusions to which the author conducts us:

"1. Accepting the rate of the tidal propagation as a criterion of the condition of the receiver, the progress of the early flood is a test of the state of the bed, while that of the latter flood and crest of the wave are equally so of the foreshores and margins.

"2. To avoid the evil of an increased fall at the head of the tidal river, which would invite the gravel of the upper course to move lower down, the tidal flow should be the limit of remedial operations.

"3. Improvements should begin from below, because that part of the navigation is more generally important, and rivers have also been greatly improved at a distance from their confluence with the sea by simply deepening their outfalls.

"4. *Every portion* of the alveus of a tidal river is valuable as a receptacle, in whatever

part of the river it may be situated. The first operation of the flood is somewhat like that of a wedge, creeping up under the descending land waters, and elevating them, till, as it opposes greater resistance, it dams them back, and then reverses them, making high water in the upper course of the tidal river by the reversed action of the land water. Thus, in the Thames (and which applies more or less to other tidal rivers) the salt water at high-water springs ceases at Greenwich, and yet the flood runs strongly past London and continues to Kingston, 24 miles above it. It follows, then, that the larger the expanse at the head of the river for the fresh water to spread itself into, the less space it will occupy in the main channel, and more tidal water in the same proportion will enter the channels below. And so with every part of the estuary; *not a fraction of the quantity is useless;* for though the precise particles above a certain distance from the sea may not reach the outlet, yet they add to the momentum and scouring power of the whole of the intermediate stream.

"5. Straight reaches *are strictly to be avoided*, but more particularly where there is an established business upon the banks of the river to be trained. With a straight reach the deep-water track is acted upon by the most trifling causes, ranging from side to side at will; and it follows that, under these circumstances, there is no security whatever for the permanency of the deep water, either in a fixed channel or at the shipping berths.

"6. Dredging should go hand in hand with the formation of the training walls; first, to prevent the soil being scoured from the shallower into the deeper portions of the navigation, and next, to break up the indurated crust of those ancient shelves or banks which are so firmly bound as to resist the improved energy of the current. *Dredging, as a system, is an error in principle; it is an attack upon the effect rather than the cause;* but as an adjunct in the way we recommend, it may be essential, as it aids Nature in the attainment of that permanency which is the aim of her properly directed operations, but which she cannot in some cases arrive at unassisted. When the river has been fully trained, and brought into a state of equilibrium, dredging would only be occasionally necessary here and there for the removal of a casual obstruction, as the stream would then be comparatively in a self-sustaining state.

"7. While the training walls are being formed, the natural shores should be straightened and defended, to prevent their wastage adding to the moveable matter in the tidal basin.

"8. Entrances to docks *within the natural shores* might easily be appended to such a system without breaking the unity of the design, or interfering with the action of the stream.

We earnestly commend the work to all who are in any way concerned in the conservation of our commercial rivers and harbours, and of those havens which afford such invaluable shelter from the perils of our stormy and dangerous coast. And we also submit that the general reader will do well to put himself in possession both of the facts which the Author records, bearing upon a subject of which no intelligent person should be altogether ignorant, and also of the scientific elucidations of those facts which he supplies.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

JOB CUTLER, of Birmingham, Warwick, manufacturer. *Improvements in the manufacture of spoons and forks, and other similar articles for domestic use.* Patent dated February 16, 1853. (No. 401.)

The object of this invention is to dispense with the ordinary process of casting in strips, rolling, cutting into smaller strips, cross-rolling, cutting out, and stamping into patterns. The inventor describes certain methods of casting spoons, forks, &c., of iron,—pickling them by dipping them in diluted sulphuric acid,—washing them in clear water,—annealing them by placing them on alternate layers of charcoal-dust, coke-dust, and Cumberland ore, and then heating them in a suitable annealing muffle,—again pickling and washing them,—filing, smoothing, and shaping them,—and, finally, coating or covering them with a metal or metals. He also describes a method of casting spoons, forks, and other such articles of brass, German silver, and other such metals or alloys of metals; and of setting these articles into their proper shapes by suitable tools, which also are described.

GEORGE GRAY MACKAY, of Grangemouth, near Falkirk, North Britain, managing proprietor of the Grangemouth Coal Company. *Improvements in the construction of drain-pipes.* Patent dated February 16, 1853. (No. 403.)

The inventor describes and claims a mode of manufacturing earthenware drain-pipes in two distinct halves or segments, the meeting edges being stepped so as to overlap each other slightly. Segmental bricks may be used in a similar manner instead of half pipes; and the transverse section may be of any required shape.

JOSEPH SKERTCHLY, of Kingsland, Mid-

dlesex. *Improvements in copying presses.* Patent dated February 16, 1853. (No. 404.)

The nature of this invention may be seen from Mr. Skertchly's claims:

1. The combination of any of the respective parts of lithographic and copying presses in one machine that shall be applicable both to lithographic purposes and to the ordinary copying of letters.

2. The employment in one machine of a beam and scraper, or a roller with a platten in connection with a fixed or moveable bed.

Edouard Sy, of 17, Clifford-street, Bond-street, Middlesex. *Improvements in bookbinding.* Patent dated February 16, 1853. (No. 406.)

This invention consists in making the backs of books in two or more parts, longitudinally, and applying steel or other springs to them, in order that the books (particularly large ones) may open and close more conveniently.

John George Perry, of No. 12, Westbourne-street, Hyde-park Gardens. *Improvements in bookbinding, to facilitate the finding of places in books.* Patent dated February 16, 1853. (No. 407.)

This invention consists in notching the leaves of books so as to form recesses, which indicate the contents of their different portions. These recesses are to be lettered; but the inventor does not claim generally the lettering of the edges of the leaves of books.

Charles Sheppard, of Maesteg Ironworks, near Bridgend, Glamorgan, ironfounder and engineer. *An improved stove and apparatus for heating air for blast purposes.* Patent dated February 16, 1853. (No. 408.)

A full description of this invention forms the first article of this Number.

William Bridges Adam, of No. 1, Adam-street, Adelphi, Middlesex, engineer. *Improvements in railways.* Patent dated February 17, 1853. (No. 412.)

Claims.—1. The construction and application of lateral or side-brackets of timber, or metal, or other material, to rails, such as may be commonly used with chairs, the vertical sides of the brackets being in close contact with the rails, and the lower side bearing on the sleeper, the said brackets being bolted through the rails.

2. The construction and application to rails laid on sleepers, of brackets not fastened to the rails, but pressed against them, and secured in a groove of the sleeper.

3. The combination of deep double-headed rails with longitudinal timbers bolted in the side-channels, through the vertical web.

4. The construction and combination of brackets with joint plates to secure the joints of rails by increasing their length beyond that of the intermediates.

5. The construction and combination of chairs with sunk central steps, for the purpose of lowering the rail.

6. The construction and combination of rails with tables formed of separate parts.

7. The construction and combination of girder-rails, for the purpose of lowering the rails on the sleepers, and better securing the gauge of way.

8. The construction of certain machines to be used in forming the various parts before described.

James Murphy, of Newport, Monmouth, civil engineer. *Improvements in the permanent way of railways.* Patent dated February 17, 1853. (No. 413.)

Claims.—1. The use of cast or wrought-iron bearings for rails, placed on each side of the rails and between the upper and lower webs of the double-headed rail, the same being applicable to single-headed rails.

2. The use of bearing-plates, or sleepers, for the support of rails (or chairs holding or supporting rails), formed with a strengthening-piece or rib, or with a stop or projection on the upper side of the bearing.

William Pidding, of the Strand, Middlesex, gentleman. *Improvements in the treatment and preparation of saccharine substances, and in the machinery or apparatus connected therewith.* Patent dated February 17, 1853. (No. 414.)

This invention relates to the defecation of sugar, and of saccharine matters generally. We must leave the nature of the invention to be sought for in the following *literal* claims:

1. "The use of bituminous substances (that is to say) Animal or Vegetable tar or pitch margarie oleic or fat acids wax stearine spermaceti and greases prepared in the manner described the resins usually called gum Resin Rosin or Colophony when combined with the Hydrate of Alumina precipitated Silica or oxide of iron.

2. "The combination of margarie acid wax and grease prepared as hereinbefore described with rosin previous to its admixture with Hydrate of Alumina Silica or oxide of iron for the foregoing purposes.

3. "The combination of the vacuum pan and the filter as shewn by means of which much labour and loss of time is saved.

4. "The treatment as hereinbefore described of sugar after crystalization by drawing off the residual syrup by means of vacuum, both before and after it is placed in moulds."

Matthias Walker, of Horsham, Sussex, ironmonger. *Improvements in vessels or apparatus for containing and preserving ale, beer,*

and other liquors. Patent dated February 17, 1853. (No. 415.)

This invention consists in forming a vessel having a hollow case or jacket around it, in which cold water or other cooling fluid can be placed, for the purpose of keeping the liquid within the vessel cool.

Thomas Clark Ogden, of Manchester, Lancaster, cotton-spinner, and William Gibson, of the same place, manager. *Certain improvements in machinery or apparatus for spinning cotton and other fibrous materials.* Patent dated February 17, 1853. (No. 418.)

Claims.—1. A novel form or construction of the "under faller" and apparatus for actuating the same; and also the application of a series of wires to the top faller, as described.

2. The regulating of the distance of the drawing-rollers, by means of a rod or bar having diagonal projecting pieces or inclined planes acting simultaneously the whole length of the mule or spinning-frame, as described.

3. The scroll and lever for applying the requisite amount of friction to the "winding-on pulley," as described.

4. An apparatus for applying the friction to the "pulling-up pulley," and regulating the same as described.

Charles Watt, of Selwood-place, Brompton, and Hugh Burgess, of 27, Grove-terrace, Kentish-town, both of Middlesex. *Improvements in coating iron with copper and brass.* Patent dated February 17, 1853. (No. 421.)

We published in the last Number of our Magazine an account of some important experiments which have been lately made at Woolwich Dockyard, for the purpose of testing the value of this invention. We shall now describe the processes to which the iron is subjected during the operation of coating.

The articles to be covered are to be first well cleaned in dilute sulphuric acid, and then washed carefully in a dilute solution of chloride of zinc, and afterwards dried. They are then heated to any temperature short of that which would drive off the zinc, and plunged into melted copper or alloy of copper. A mixture of 97 parts of copper, 2 of zinc, and 1 of tin, answers better than pure copper. The length of time which they should remain in the bath varies with the size of the article and the heat of the bath. A three-quarter of an inch bolt requires to be kept in about three seconds. When the articles are taken out of the molten metal, they are introduced into a tank containing an atmosphere of steam and carbonic acid, or of carburetted hydrogen, or of any other deoxidizing vapour. In some instances it is desirable to protect the coated articles from oxidation by drawing them through a covering of flux spread upon the surface of the melted metal.

For fixing points of mixed metal upon iron bolts, these, after being coated with copper or brass, have their points made blunt and brightened. They are then arranged in certain boxes described by the inventor, and pipes a little larger than the bolts are placed over the points. The bright iron points are then moistened with a dilute solution of chloride of zinc (or with either of several other solutions described by the inventors), and then dried by placing a coke fire over them in an iron basket. The melted metal is then poured upon them, and allowed to cool.

The claims of the inventors are not stated in their specification.

Isaac Frost, of 49, Tavistock-terrace, Upper Holloway, Middlesex. *Improvements in reaping or cutting crops.* Patent dated February 17, 1853. (No. 422.)

This invention consists in applying circular saws, in combination with instruments for receiving the stems or straw of the crop. For this purpose, several angular points or instruments project from a bar or frame near the ground, which, when in use, is moved forward, by which means the stems of a standing crop are received between these projections, and held there till they are cut by the circular saws.

William Darling, of Glasgow, Lanark, North Britain, iron merchant. *Improvements in the manufacture of malleable iron and other metals.* Patent dated February 18, 1853. (No. 436.)

Claims.—1. A certain described arrangement of machinery.

2. A mode of working or driving iron rolling apparatus, wherein the actuating steam engine or prime mover works at a higher rate than the rolls.

3. The application and use of speed reducing gearing only between the engine and the rolls of metal-working machinery.

4. A certain mode of arranging the puddling or other furnaces employed in the manufacture of iron and malleable metals semicircularly, or in such manner that the whole of them may be at a uniform distance from the chimney, or nearly so.

5. The application and use of the puddling or other furnace flue-heat for the generation of steam, as described.

6. The application and use of mechanically-worked flue-bars for puddling or other furnaces.

Nathan Dutton, of 31, Great George-street, Liverpool, Lancaster, cabinet-maker. *Improvements in the manufacture and application of dowels and machinery connected*

therewith, parts of which machinery are applicable to other purposes. Patent dated February 18, 1853. (No. 429.)

The complete specification of this patent was filed with the application.

The inventor describes and claims,—

1. A particular construction of lathe for turning dowels or wooden pins, which may also be employed for turning circular rods generally.

2. The application of this lathe to the purposes of wood-turning generally.

3. The arrangement of a machine for drilling holes in wood.

4. The method of accurately uniting all kinds of woodwork by means of the dowelling machines before mentioned.

James Chadnor White, of Liverpool-street, London, harness-maker. *Improvements in fastenings for harness, and which are also applicable to other like purposes.* Patent dated February 19, 1853. (No. 430.)

The chief part of this invention consists in constructing a tug-slide for traces, composed of a metal frame, having an "*oblong square*" opening, and in this opening a groove in which slides a plate carrying a spring, that has a square head attached to it. This square head fits into a corresponding hole in the metal frame, and by means of these the fastening is effected.

Claims.—1. The peculiar construction of a tug-slide, with the particular mode of placing the spring-catch as a fastening for traces and other parts of harness.

2. The employment of a galvanized iron tube in connection with the tug-slide.

3. The application of the principle of this tug-slide to the formation of buckles or clasps for fastenings generally.

Frank Clarke Hills, of Deptford, Kent, and George Hills, of Lee, in the same county, manufacturing chemists. *Certain improvements in refining sugar, and in preparing materials applicable for that purpose.* Patent dated February 19, 1853. (No. 431.)

Claims.—The employment of phosphate of lime, steamed or calcined bones, sawdust, asbestos, pumice-stone, or other analagous absorbent material, excepting animal or other charcoal, to abstract lead, or salts, or other combinations of lead from saccharine solutions.

2. The employment of acetic, muriatic, or nitric acid, for removing lead, or salts, or other combinations of lead from phosphate of lime, animal or other charcoal, steamed, or boiled, or calcined bones, sawdust, asbestos, pumice-stone, or other analogous porous material, which may have been employed in abstracting such lead or salts, or other combinations of lead from saccharine solutions.

Charles Nightingale, of Wardour-street, Soho, Middlesex, bedding manufacturer. *Certain improvements in drying and heating certain substances or articles.* Patent dated February 19, 1853. (No. 434.)

Claims.—1. The application of gas at the circumference of a revolving cylinder, for the purpose of drying and heating the substances or articles therein.

2. The application of gas to the centre of a revolving cylinder, for the like purpose.

James Anderson, of Auchnagie, Perth, North Britain, farmer. *Improvements in obtaining motive power.* Patent dated February 19, 1853. (No. 435.)

The air or matter to be employed for obtaining motive power is, according to Mr. Anderson's invention, primarily compressed to a considerable extent, and while being thus compressed is to receive into it a jet of cold water, which is to absorb the evolved heat. When the necessary degree of compression is reached, heat is to be applied to the air for the purpose of increasing its expansive power. The inventor claims the above process.

Pierre Auguste Tourniere, of 14, Kennington-terrace, Upper Kennington-lane, Surrey, gentleman. *Improvements in propelling.* Patent dated February 19, 1853. (No. 436.)

Our readers are familiar enough with the chief part of this invention, which consists in the employment of swing-floats for propelling ships and boats, such floats being hinged to a paddle-frame that draws them alternately backwards and forwards.

Claims—1. The application and use of swing-floats in combination with stops, for propelling ships or boats.

2. A mode of reversing the stops when the vessel is to be moved backwards.

3. A mode of working the floats, either by a fly-wheel or by both combined.

Wright Jones, of Pendleton, Lancaster, engineer. *Improvements applicable to steam pipes used for warming, drying, or ventilating.* Patent dated February 21, 1853. (No 437.)

The claim, though short, exhibits the nature of this invention; it is, the adaptation to pipes for warming, drying, or ventilating, of an apparatus provided with a valve for the discharge of air; such valve being capable of closing against the exit of steam without the interference of an attendant.

Samuel Rodgers Samuels and Robert Sands, of Nottingham, lace manufacturers. *Improvements in looms for weaving.* Patent dated February 21, 1853. (No. 438.)

Claims.—1. The constructing of looms for weaving in such manner that the shuttles shall traverse across the width of the

loom instead of lengthwise, as hitherto practised.

2. The use and application to looms of a new form of shuttle, whereby a greater number of widths of work may be produced in the same space than by the use of the shuttles hitherto employed, and by which the several widths of work are made across the face of the loom, or in the direction of its length.

3. The use and application to looms of two shuttles, in and for the manufacture of plaided goods.

4. The use and application to looms of two, three, or more shuttles in combination with moveable comb-bars and shuttle-guides, or races, in and for the manufacture of checked and plaided goods, and for weaving in colours, as particularly described.

5. The use and application to looms of certain mechanical arrangements in and for the manufacture of pile fabrics.

James Mash, of Highfield-terrace, Kentish-town, Middlesex, consulting engineer, and Joseph Sharp Bailey, of Keighley, York, manufacturer. *Improvements in weaving machinery employed in the manufacture of textile fabrics, and in the manufacture of such fabrics.* Patent dated February 21, 1853. (No. 441.)

Claims.—1. The application to weaving machinery, and the employment therewith of shuttles carrying weft threads, which are thrown or passed through sheds in the warp threads in any direction inclined to the plane of the warp threads when unshedded, and from side to side of the warp, and not from edge to edge of it; such sheds being opened also in inclined directions.

2. The manufacture of textile fabrics by throwing the weft threads through the sheds of the warp unshedded, and from side to side of the warp, such sheds being opened also in inclined directions.

3. The manufacture of textile fabrics with two or more weft threads, each extending over a portion only of the width of the fabric.

William Pidding, of the Strand, Middlesex, gentleman. *Improvements in coverings for the feet of bipeds or quadrupeds.* Patent dated February 21, 1853. (No. 442.)

This invention relates to a species of boot or shoe, the object of which is to render the same lighter and more elastic, or yielding to the sole of the foot. Instead of making solid soles the inventor proposes to make them hollow, and of India-rubber or gutta percha filled with liquid, oil being preferred. Numerous India-rubber threads are sown through the soles for the purpose of preserving their forms.

Richard Farrant, of Pimlico. *An improved chimney-pot.* Patent dated February 21, 1853. (No. 443.)

The novelty of this invention consists in forming a chimney-pot with spiral openings and projections on the pot or shaft, for the purpose of preventing a downward draught. The top of it is closed, so that the smoke can only escape through the spiral openings.

Ezra Miles, of Soulbury, Bucks. *Improvements in railway brakes.* Patent dated February 21, 1853. (No. 444.)

This invention consists in the application of hydrostatic pressure to the brakes of railway carriages, in such manner that the brake of every carriage throughout the train can be brought into immediate action, thus quickly stopping its progress. This is accomplished by fixing beneath each of the carriages, trucks, or wagons, a metal tube, or tubes, in connection with a cylinder, which is screwed to the framing of the carriage in any convenient manner. These tubes are furnished with joints, so that when a number of carriages, trucks, or wagons are linked together the tube or pipe forms an uninterrupted communication from one end to the other. The tender to the locomotive has also a similar tube to those before-mentioned, which communicates with the water in the tank, and is continued beyond this, and finally enters the boiler of the locomotive. From this tube another is carried on to the front of the engine, and is closed by a tap. The whole is so arranged that the tubes and cylinders beneath the carriages are filled with water from the tank of the tender. The piston of each cylinder is connected by a lever to others which work the brakes. When it is required to put on the brakes it is done by simply turning a cock or tap, so as to allow a small portion of water to issue from the engine-boiler, by which means the water in the tubes is connected with and caused to receive the pressure of that in the boiler; this immediately causes the pistons of the cylinders to rise and thus forces the brakes against the wheels. By this means a considerable friction is brought to bear upon them.

The inventor prefers that every carriage, truck, and wagon of the train should be furnished with brakes, although at present two or three carriages only are supplied with them. The brakes now in use may be retained in addition to Mr. Miles', for use when the engine is disconnected.

Claim.—The application of hydrostatic pressure to the working of brakes of railways, for the purpose of stopping or retarding trains in the manner described.

Thomas Bell, of Bristol, Gloucester, engineer, and Richard Chrimes, of Rotherham, York, of the firm of Guest and

Chrimes, brass-founders. *Certain improvements in valves applicable to the receiving and discharging of water or other fluids.* Patent dated February 21, 1853. (No. 445.)

This invention relates; *firstly*, to a combination of two valves in one, for the purpose of receiving or discharging fixed quantities of fluids; and, *secondly*, to what are termed self-acting sluice-valves for discharging water from the mains of water-works, each of which sluice-valves consists of a cylinder having an accurately-fitted piston, which is attached to a rod working through a stuffing-box connected to the valve of the sluice, to which it will impart motion upwards to open the valve when the pressure of the water in the main is conveyed under the piston, and downwards to shut the valve when it is conveyed above the piston.

Benjamin Barton, of Old Kent-road, Surrey, ironmonger. *An improved bath, which can also be used as a life-boat.* Patent dated February 21, 1853. (No. 446.)

This invention consists in constructing a bath, the framing of which is of metal, and the lining of vulcanized caoutchouc, or other similar vulcanized waterproof fabric, in such manner that the whole can be packed, when folded, in a small compass. When the apparatus is intended to be used as a bath only, the lining may be of a single thickness, but if intended to be used on board ship, or under other circumstances where it might be serviceable in the preservation of life from shipwreck, the lining should be composed wholly or partially of two thicknesses of waterproof fabric, made air-tight at the edges, and provided with a tube and mouth-piece for the introduction of air.

John Charles Pearce, of the Bowling Iron-works, near Bradford, York, engineer. *Improvements in steam boilers.* Patent dated February 21, 1853. (No. 447.)

Claims.—1. The construction of steam boilers, with the furnace or furnaces and tubes combined with mixing and smoke-chambers, and arranged as described, with or without a return flue underneath the boiler; and also the use, in certain cases, of the central fire-box (when three are employed), as a flue or mixing-chamber.

2. The adaptation of rings, ferrules, or collars, riveted or otherwise fitted to the ends of the tubes of steam boilers, for the purpose of enabling the tubes to be fixed in the tube-plate.

3. The coating or covering of the glass water-gauge pipes of steam boilers with tin, lead, or other soft metal or alloy cast thereon, so as to leave a slot or slots, to enable the height of the water in the pipe to be seen.

John Davie Morris Stirling, of the Larches, near Birmingham, Warwick, Esq. *Improvements in the manufacture of wire.* Patent dated February 21, 1853. (No. 448.)

This invention has for its object the manufacture of wire from zinc and its ductile alloys coated with silver and suitable alloys. This is effected by causing the zinc or its alloys to be first coated on all sides and then drawn into a wire, or by applying the coating during the time, or between the times of drawing the wires. When silver is to be the coating metal, a convenient mode of proceeding is to coat the zinc on all sides with silver by pressure, or to fill a tube of silver with zinc or its ductile alloy, and then to draw the same into wire.

William Wilkinson, of Nottingham, framework-knitter. *Improvements in the manufacture of ropes, bands, straps, and cords.* Patent dated February 21, 1853. (No. 449.)

For the manufacture of circular ropes and cords, the inventor takes a core of gutta percha or other waterproof material, either solid or hollow, and plaits or braids round it strands of hemp, silk, or metal wire, or strips of leather, or other protecting material, which can be laid on in a plaiting or braiding machine.

For flat bands and straps he covers a flat solid or hollow band of gutta percha, or other like material with plaitings or braidings of similar materials to those just enumerated.

James Hudson, of Halifax, and Thomas Bamford Hudson, of Malton, both of York. *Improvements in the manufacture of bricks, tiles, and drain pipes or tubes.* Patent dated February 22, 1853. (No. 450.)

This invention consists of a machine in which the plastic material is supplied through a hopper and forced down by screws into compartments formed in a reciprocating plate or frame, the number of which compartments may be varied, but whatever their number may be, while one half of them are receiving the plastic material, the other half are delivering, or having forced from them the material already moulded. Compression is given to the plastic material forced into the compartments of the slide, by means of a plunger or shifting plate, which, with a fixed plate, completes the form of the bricks; and these as they are forced from the reciprocating plate, are received on to boards or on to endless travelling-aprons. When it is required to use the machine for the production of tiles, drain-pipes, or tubes, and also of perforated or hollow bricks, the reciprocating-plate and the parts acting with it are dispensed with, and suitable moulding orifices are applied, such as are commonly used in other similar machines.

Claim. — The mode of arranging and

combining parts into the machine as described.

PIERRE FREDERICK GOUGY, of Castle-street, gentleman, and DAVID COMBE, of King-street, gentleman, both of Middlesex. *Improvements in apparatus for skidding or stopping wheels of carriages and other vehicles.* Patent dated February 22, 1853. (No. 451.)

The inventors describe and claim methods of adapting the skid to carriages and vehicles having either two or four wheels, in such manner that it shall be entirely under the control of the driver or other person whose duty it is to apply the skid when necessary, and this without either causing him to alight from the vehicle or to stop its progress. By this means a great saving of time is effected, and the skid is always easy of application in cases of emergency.

GEORGE WINIWARTER, of Red Lion-square, Middlesex, civil engineer. *Improvements in the manufacture of fire-arms* Patent dated February 22, 1853. (No. 452.)

The character of this invention may be seen from the following

Claim.—The construction of the stocks of fire-arms of metal, alone or in combination with gutta percha, board made from straw-pulp, or other suitable material capable of being moulded into the required form.

COMPLETE SPECIFICATION FILED WITH APPLICATION.

JOHN WEBSTER COCHRAN, of 17, Gower-street, London, Middlesex. *Improvements in machinery for crushing, grinding, and pulverizing stone quartz or other substances.* Filed August 20, 1853. (No. 1945.)

This invention relates to certain improvements in Cochran's machine, of which we gave a description in No. 1565, August 6, 1853. The inventor describes and claims—

1. A method of constructing the outside plates or discs, so as to receive interior moveable discs or bushings, in order that those parts of the machine which are more exposed than the others to wear and damage, may be readily replaced without supplying new entire discs.

2. The following arrangement of the standards, and the grating or screen which they support, and through which the ground materials pass when the machine is at work and the trough. The standards step in the flange which forms the outer circumference of the lower plate. The lower edges of the panels rest in a groove cast in the same flange, and the sides of the panels are bent into wedge-like recesses formed in the insides of the standards. These recesses are made sufficiently large to receive keys, which are tightened by bolts passing through the standards and tapped into the keys. Sheet iron or other covering extends from the outside extremity of the trough to within a short distance of the uppart plate, where it may be finished off with a border of leather, or some such elastic substance.

3. A method of constructing the centre hub and bushing connected with the upper and moveable plate which is turned by them through the medium of a centre shaft attached to a steam-engine, without any intermediate gearing.

PROVISIONAL PROTECTIONS.

Dated May 26, 1853.

1290. Edward White, of Ipswich, surveyor. Improvements in arrangements for supplying water to towns or other places.

Dated May 31, 1853.

1337. Hesketh Hughes and William Thomas Denham, both of Cottage-place, City-road, Middlesex, engineers. Improvements in pianofortes.

Dated July 13, 1853.

1667. Arnold Morton, of Cockerill's-buildings, Bartholomew Close, London, colour-manufacturer. Improvements in the manufacture of paints, pigments, and materials for house-painting, paper-staining, and decorative purposes generally.

Dated July 15, 1853.

1697. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improvements in machinery or apparatus for digging, excavating, and removing earth. A communication.

Dated July 18, 1853.

1710. Samuel Perkes, civil engineer, of Walbrook, City, London. Improvements in the construction of portable metallic folding bedsteads, chair bedsteads, chairs, sofas, couches, settees, and such like articles for the use of emigrants and others, and part of which improvements are applicable to ordinary bedsteads, sofas, couches, chairs, and such like articles in general.

Dated July 21, 1853.

1723. John Lilley, of Thingwall, Woodchurch, Chester, merchant. Separating the refuse vegetable matter contained in the stalk and leaves of the plantain species, and also trees grown in tropical climates from the fibrous material of the same, in order that the latter may be manufactured into ropes or cordage, and for other purposes for which hemp and flax are used.

Dated July 25, 1853.

1750. Charles Frederick Spieker, of New York, United States, professor of chemistry. Improvements in generating and fixing ammonia.

Dated August 2, 1853.

1801. John Griffiths, of Stepaside Saunderfoot, near Tenby, Pembroke, South Wales, engineer. Certain improvements in steam engines.

1803. William Lanphir Anderson, of Norwood, Surrey, gentleman. An improved propeller, and method of driving the same.

1805. Antoine Joseph Quinche, of Paris, France, and of Holborn, City, London. An improved apparatus for measuring distances travelled over by vehicles.

1808. Matthias Edward Bourn, of Crayford, Kent,

India-rubber manufacturer. Improvements in supplying ships or other vessels with water, air, or ballast.

1809. George Richardson, of Gutter-lane, Cheapside, London, gas-fitter. Improvements in stoves for warming or heating buildings.

Dated August 3, 1853.

1810. Thomas Atkins, of Oxford, civil engineer. Improvements in transmitting power and communicating motion to agricultural implements.

1811. Joseph Clisild Daniell, of Bath. An improvement or improvements in preparing food and litter for cattle, pigs, and other animals.

1812. John Slack, of Manchester, Lancaster, manager. Improvements in reeds for looms.

1813. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery for cutting cardboard, paper, and other similar materials. A communication.

1815. William Sargeant Roden, of Ebbw Vale Ironworks, Monmouth, gentleman, and William Thomas, of Ebbw Vale Ironworks, same county, master puddler. Improvements in rolling metals.

1816. John Macintosh, of Pall-mall, Middlesex. Improvements in the construction of bridges, viaducts, and other like structures.

1817. Aristide Michel Servau, of Philpot-lane, London. Improvements in the manufacture of soap.

1818. James Billings, of Luton-place, George-street, Greenwich. Improvements in roofing buildings.

1819. John Cumming, of Glasgow, Lanark, North Britain, pattern designer. Improvements in printing shawls, handkerchiefs, piece goods, paper-hangings, and similar materials, and in the apparatus connected therewith.

Dated August 4, 1853.

1820. William Hickson, of Carlisle, Cumberland, gentleman. Improvements in canal and river navigation, and in vessels to be used in such navigation, and in the mode of propelling the same.

1821. Charles Hill Snell, of the Triangle, Hackney, Middlesex, chemist. Improvements in the manufacture of soap.

1822. George Armitage, of Bradford, York, dyer. Improvements in the construction of presses.

1823. Charles Butler Clough, of Tyddyn, Flint. Improvements in machinery or apparatus for washing, scouring, cleansing, or steaming woven fabrics, either in the piece or garment, also felts or fibrous substances, and corn, roots, seeds, or similar matters.

1824. Richard Brown Roden, of Abersycham Ironworks, near Newport, Monmouthshire. Improvements in rolling iron and all other malleable metals and alloys.

1825. Thomas Moss, of Gainford-street, Islington, Middlesex. Improvements in printing banknotes, checques, bills of exchange, and other documents requiring like security against being copied.

1826. Barthelemy Louis François Xavier Fléchelle, gentleman, of Paris. Certain improvements in the means of carrying, bedding, and bathing the injured, ill, or invalid persons.

1827. George Fergusson Wilson, of Belmont, Vauxhall, Surrey, managing director of Price's Patent Candle Company, and Alexander Isaac Austen, of Trinity-place, Wandsworth-road, Surrey, engineer. Improvements in the apparatus used in the manufacture of mould candles.

Dated August 5, 1853.

1829. William Smith and Thomas Phillips, of Snow-hill, Middlesex, gas-engineers. An improved boiler.

1830. Richard Peters, of Southwark, Surrey, engineer. An apparatus or machine for ascertaining the distance traversed by cabs and other vehicles.

1832. Edward Taylor Bellhouse, of the Eagle Foundry, Manchester, Lancaster, engineer. Improvements in fireproof structures.

1833. William Garforth and James Garforth, of Dukinfield, Chester, engineers. Improvements in machinery or apparatus for manufacturing bricks.

1834. Robert Hunt, of Cottage-place, Greenwich, Kent, gentleman. An improved tile, and an improved method of making tiles.

1835. James Lee Norton, of Holland-street, Blackfriars, Surrey. Improvements in obtaining wool from fabrics in a condition to be again used.

1836. William Newton, of Chancery-lane, civil engineer. Improvements in the process of coating cast iron with other metals, and the alloys of other metals. A communication.

Dated August 6, 1853.

1837. Martin Zadick Just, of Manchester, merchant. Improvements in machinery for hulling and dressing paddy or rice. A communication.

1838. John Hughes, of Great George-street, Westminster, civil engineer. Improvements in building or forming structures under water, or below the surface of the ground.

1839. John Marten, of High-street, Marylebone, Middlesex. An improved shade for gas-burners and lamps.

1840. Auguste Edouard Loradoux Bellford, of Holborn, City, London. Improvements in the combination of glass with iron or other metals, to serve for the construction of floors, walls, roofs, or parts thereof, or of windows for buildings, and also of translucent pavements, lights for subterranean apartments, and for any purpose for which a translucent medium possessing great strength is desirable. A communication.

1841. Richard Bartholomew Martin, of Suffolk-street, Haymarket, London. An improved plate-warmer.

1843. Robert Morrison, of Newcastle-upon-Tyne, engineer. Improvements in apparatus for forging, shaping, and crushing iron and other materials, and for driving piles.

1844. Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, London. Improvements in transmitting power. A communication.

1845. John Green, of Queenhithe, London. Improvements in printing-machinery. A communication.

Dated August 8, 1853.

1846. Richard Christy, of Fairfield, Lancaster, manufacturer, and John Knowles, of the same place, manager. Improvements in the manufacture of terry cloth, or other woven fabrics having looped surfaces, and in the machinery or apparatus connected therewith.

1847. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improvements in horse-shoes. A communication.

1848. William Hickson, of Carlisle, Cumberland, gentleman. Improvements in the application of heat for baking and drying purposes, and in the generation of steam.

1849. Moses Poole, of Avenue-road, Regent's-park, Middlesex. Improvements in regulating the flow and pressure of gas and other fluids. A communication.

Dated August 9, 1853.

1850. Thomas Young Hall, of Newcastle-upon-Tyne, coal-owner. Improvements in combining glass with other materials.

1852. William Rowan, of the firm of John Rowan and Sons, of Belfast, Antrim, engineers. Improvements in looms for weaving, and apparatus connected therewith.

1854. Louis Hartog Bruck, of Mark-lane, London, gentleman. Improvements in the construction of tunnels, sewers, drains, pipes, tubes, chan-

nels, and other like conduits, for hydraulic or pneumatic purposes.

Dated August 10, 1853.

1856. Henry Peters, of Birmingham, Warwick, manufacturer. Improvements in pens and penholders.

1858. James Burden, of Stirling, Scotland, brewer. An improved cock or tap.

1860. Jean Pierre Albert Galibert, of Paris, France, doctor of medicine, and of Trafalgar-square, Middlesex. An improved domestic telegraph.

Dated August 11, 1853.

1866. John Rushbury, of Wolverhampton, Stafford, locksmith. A new or improved lock.

1868. Thomas Dewsnup, of Manchester, Lancaster, stay and corset-manufacturer. Improvements in obtaining motive power.

1872. Henry Moore Naylor, of Montpelier-row, Bloomsbury, Birmingham, Warwick. Improvements in affixing postage and other stamps.

1874. George Deards, of Harlow, Essex. Improvements in lamps.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," August* 19*th*, 1853.)

673. Charles Harratt. Improvements in strengthening the masts of ships and vessels.

(*From the "London Gazette," August* 23*rd*, 1853.)

731. George Robb. Improvements in the manufacture of sulphuric acid, alkalis, and their salts.

749. Isaac Rider. Improvements in cocks for drawing off beer, or other liquids.

774. John Radcliffe. Improvements in looms for weaving.

788. George Robb. Improvements in the manufacture of sulphuric acid, alkalis, and their salts.

832. William Augustus Pascal Aymard. Certain improvements in the preparation for, and application to, the manufacture of candles, and other purposes, of certain fatty and resinous bodies or substances. A communication.

844. George Frederic Goble. Improvements in safety valves for steam boilers and gas chambers.

855. George Frederic Goble. Improvements in machinery to be actuated by water or air.

862. Robert Bostwick Ruggles. Improvements in machinery for beating gold and other laminæ of metal.

932. Joel Watts. Improvements in the construction of pistons of steam and other engines, applicable also to force-pumps and lifting-pumps.

1049. James Bristow and Henry Attwood. Improvements in the means of consuming smoke.

1064. François Monfrant. Improvements in lubricating materials. A communication.

1656. Andrew Burns. Improvements in constructing iron ships, boats, boilers, and other metallic structures.

1667. Arnold Morton. Improvements in the manufacture of paints, pigments, and materials for house painting, paper staining, and decorative purposes generally.

1681. George Gowland. Improvements in certain nautical and surveying instruments.

1697. William Edward Newton. Improvements in machinery or apparatus for digging, excavating, and removing earth. A communication.

1698. Edmund Reynolds Fayerman. A method of and instrument for keeping time in music.

1714. Charles Breese. A method of forming designs and patterns upon papier maché, japanned iron, glass, metal, and other surfaces.

1753. John Dawson. A new instrument or apparatus for the purpose of preventing fraud in drawing off liquids.

1780. George Katz Douglas. Certain improvements in the permanent way of railways.

1781. William Woods Cook. Improvements in the manufacture of woven fabrics and in the apparatus employed therein.

1789. John Carvalho de Medeiros. Improvements in the means or processes for preserving metals from corrosion. A communication.

1791. Philipp Schafer and Frederick Schafer. An improvement in travelling bags.

1795. Augustus Russell Pope. A new and useful or improved electro-magnetic alarm apparatus, to be applied to a door or window, or both, of a dwelling-house or other building, for the purpose of giving an alarm in case of an attempt to open said door or window.

1797. Charles May. Improvements in the manufacture of bricks.

1798. Richard Holme. Improvements in the manufacture of gas.

1799. Henry Purser Valle. Improvements in reaping machinery.

1814. Charles Frederick Stansbury. Certain improvements in machinery for tempering clay and pressing or converting it into bricks. A communication.

1815. William Sargeant Roden and William Thomas. Improvements in rolling metals.

1816. John Mackintosh. Improvements in the construction of bridges, viaducts, and other like structures.

1817. Aristide Michel Servan. Improvements in the manufacture of soap.

1827. George Fergusson Wilson and Alexander Isaac Austen. Improvements in the apparatus used in the manufacture of mould candles.

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1849. Moses Poole. Improvements in regulating the flow and pressure of gas and other fluids. A communication.

1852. William Rowan. Improvements in looms for weaving, and apparatus connected therewith.

1858. James Burden. An improved cock or tap.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed August 19, 1853.

1853:

430. James Chadnor White.

441. James Mash and Joseph Sharp Bailey.

445. Thomas Bell and Richard Chrimes.
463. John Green.
622. Peter Armand Lecomte de Fontainemoreau.
646. Joseph Maudslay.
719. Charles Augustus Holm.
834. John Grist.
915. Jean Baptiste Maniquet.
1054. John Balmforth, William Balmforth, and Thomas Balmforth.
1058. John Filmore Kingston.
1261. George Marriott.
1321. Edward Duclos de Boussois.
1364. James Mayelston.
1367. Thomas Barnabas Daft.
1424. Christopher Nickels and James Hobson.
1441. Thomas Richardson.
1442. Joseph Leon Talabot and John Davie Morries Stirling.
1453. James Dilkes and Edward Turner.
1469. Clinton Roosevelt.
1471. Benjamin Finch.
1483. Henry Bessemer.
1490. James Shanks.
1537. George Sands Sidney.
1566. Peter Armand Lecomte de Fontainemoreau.
1568. Robert Moore Sievier.

Sealed August 20, 1853.

442. William Pidding.
443. Richard Farrant.
444. Ezra Miles.
452. George Winiwarter.

Sealed August 23, 1853.

478. John Palmer de la Fons.
480. Henry Martyn Nicholls.
482. John George Taylor.
516. Laurence Hill.
579. Thomas James Perry.
656. Edward Nickels.
657. John Livesay.
737. Thomas James Perry.
1240. John Hippisley.
1360. William Edward Newton.
1422. Richard Archibald Brooman.
1604. George Mackay.

Sealed August 24, 1853.

465. Henry Walmsley and Thomas Critchley.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
Aug. 11	3498	J. R. Murphy and P. Murphy	Dublin	Reclining chair.
18	3499	S. Bremner	Carlisle	Bag or pouch.
19	3500	T. D. Mills	Pentonville	Filter.
23	3501	C. Palmer	Islington	Cobbler.
25	3502	J. Cooper	Birmingham	Joiner's brace.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1569.] SATURDAY, SEPTEMBER 3, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

JORDAN'S PATENT SLATE-PLANING MACHINE.

Fig. 2.

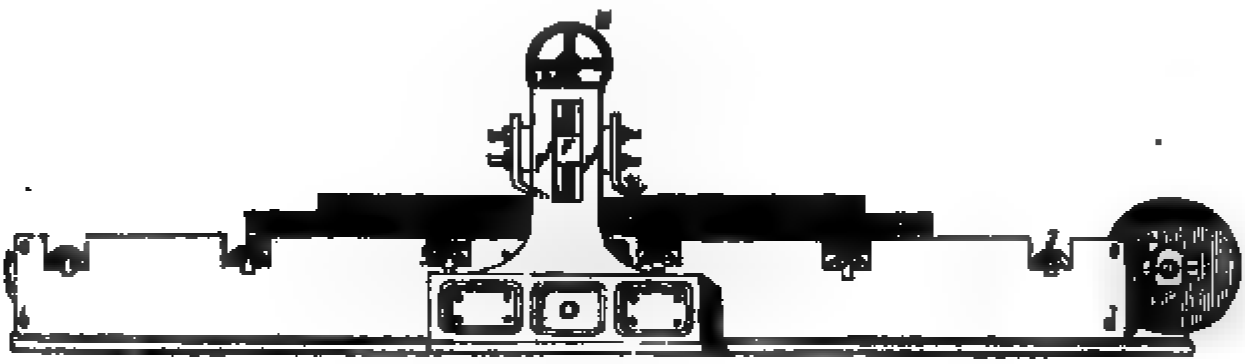


Fig. 3.

Fig. 1.

JORDAN'S PATENT SLATE-PLANING MACHINE.

(Patent dated February 24, 1853.)

Mr. Jordan's object in this invention is to effect a considerable saving both of expense and time in the operations of planing slate. The complete success of his attempt may be gathered from the following description and the accompanying engravings of his machine, which has two or more sets of cutters, or tools of different characters, which act in succession on the plate or slab of slate to be planed, and produce thereon a smooth and even surface whilst it is passing once only through the machine. He generally employs two sets of tools; the first set being composed of grooving cutters of the ordinary construction, and the second set of planing cutters, which are also of the construction commonly used, the depth to which these cutters are to work being regulated by means of a screw or other contrivance, which is arranged so as to act on the frame in which the said cutters are mounted.

Fig. 1 of the drawings annexed is a plan, fig. 2 a side elevation, and fig. 3 an end view of a slate-planing machine, having the working tools arranged according to this invention. *a, b, c, d,* is the foundation or bed-plate, furnished with rollers, *e, f, g, h, i, j,* on each side, on which the moving table, $a^1 a^1$, is supported and travels; the top surfaces of these rollers are adjusted to the same horizontal plane, and the bottom surfaces of the rails, *k, l,* which are cast underneath the moving table, are planed truly parallel to the top of the table; the outer sides of these rails are also planed to suit the distance between the guide surfaces, *m, n,* of the bed-plate, so as to prevent any lateral motion of the moving table, and at the same time admit of its having perfect freedom of motion in a longitudinal direction. The traversing movement of the table is obtained by a screw, as shown, or by a rack and pinion, or other equivalent arrangement; *o, p, q, r,* is the slab of slate being planed. This is operated on by the tools, 1, 2, 3, 4, &c., which are called grooving-tools, and by the plane-irons, A, B, C, D, both sets of tools being mounted in the same bridge, F, which is capable of sliding up and down between the standards, $F^1 F^1$, when acted on as hereinafter explained. The grooving-tools in front of the bridge form a series of grooves over the entire width of the rough slab, the extreme depth of all the grooves corresponding to the same horizontal plane by previous adjustment of the tools. The cutting-edges of the plane-irons are adjusted also to the same horizontal plane, but so as to cut a little deeper than the grooving-tools, and thus remove all traces of the grooves, and at the same time clear away the parts between them, leaving a perfectly planed surface at one cut.

The tool-bridge, F, is raised and lowered between the standards, $F^1 F^1$, by the screws, *o o,* which work through nuts tapped in the bridge, and are turned by the bevil-wheels, *p p,* mounted on the shaft, *q,* which is set in motion by the hand-wheel, E. By this means the machine can be adjusted for planing slabs of different thicknesses; but when it is employed on one particular thickness, the bridge is clamped to the standards by the screws, *s s,* and the tools have no movement whatever until that thickness of work is completed, or until they require sharpening.

It will readily be seen that according to these arrangements the operation of slate-planing can be performed with much greater dispatch and certainty than by the usual methods adopted, all movement of the cutters during a course of work being avoided, and each slab finished on one side at a single stroke of the machine, while the power requisite to produce this effect can be readily obtained, a large proportion of the resisting force of the material being destroyed by the grooving of its surface.

MONSTER STEAM-SHIPS.

We have several times been applied to for particulars concerning the proposed steam-ships of extraordinary size, which are naturally exciting great curiosity both in this and other countries, no less among those who are concerned in the science of naval architecture, than among the commercial classes. In order, therefore, to furnish our correspondents, and readers generally, with authorized and full information upon the subject, we print the following abstract of the "Report of the Court of Directors of the Eastern Steam Navigation Company," presented to the Proprietors during the last month.

"Your Directors invited tenders from several parties, and have concluded provisional arrangements for the construction of the engines and of the hull of the first ship, with Messrs. James Watt and Co., of Soho, and Messrs. Scott, Russell, and Co., of London. The ship will be built on the

great delay by the time required for coaling, but compelling the vessels to deviate widely from the best route in order to touch at the necessary coaling stations. Existing steam-ships have generally lost from twelve to twenty days in this manner, and so extended the duration of their voyages nearly to the time occupied by fast sailing vessels; thus incurring the cost of steam without securing its advantages.

"2. In avoiding the *delay* of coaling on the voyage, your ships will also escape the great *cost* of taking coals at a foreign station. These coals have to be sent out in separate ships, and have to be discharged, stored, and re-shipped into a steamer at great expense. Coals on the Indian and Australian route cost on the average, including waste and deterioration, four or five times as much per ton as in this country. Your ships will take their whole amount of coals for the voyage from near the pit's mouth at a rate not exceeding, for the best quality, 12s. to 14s. per ton. On the voyage of existing steam-ships to Australia or India and home, the consumption amounts to from 4,000 to 6,000 tons; the cost of which would supply 15 to 20,000 tons, if taken on board at some port in immediate communication with the coal-field.

"But your ships will carry, besides their own coals, upwards of 5,000 tons measurement of merchandise, and will have 500 cabins for passengers of the highest class, with ample space for troops and lower-class passengers. These you will not only be able to carry at rates much smaller than those by any existing steam-ships, but with an unprecedented amount of room, comfort, and convenience which the great size of the vessels will enable you to afford.

"In thus increasing the size of your ships, your Directors believe that they are also obtaining the elements of a speed heretofore unknown; and if hereafter coals applicable to the purposes of steam can be supplied from the mines of Australia, the carrying capacity of your ships, both for cargo and passengers, will be proportionately increased. The great length of these ships will undoubtedly, according to all present experience, enable them to pass through the water at a velocity of fifteen knots an hour, with a smaller power in proportion to their tonnage than ordinary vessels now require to make ten knots. Speed is in fact another result of great size. It is believed that by this great speed combined with the absence of stoppages, the voyage between England and India, by the Cape, will be reduced to from thirty to thirty-three days from, and between England and Australia to thirty-three or thirty-six days. The effect of such improvements in the means of communication between these countries must certainly be to greatly increase the intercourse.

"The hulls of the ships will be of iron, and of more than usual strength, whilst the magnitude of their dimensions will afford peculiar facilities for introducing many precautionary measures conducive both to strength and security. The whole of the ship's bottom, and up to six feet above the water-line, will be double, and of a cellular construction, so that any external injury will not affect the tightness or the safety of the ship.

"The upper deck will also be strengthened on the same principle, so that each ship will be a complete beam, similar to the tube of the Britannia bridge.

"The vessels will be divided into ten completely separate, water-tight compartments; and as the intermediate spaces are sufficient in such ships, being each sixty feet in length, to afford a convenient arrangement of separate saloons and cabins, the bulkheads can be carried completely to the upper deck, giving an efficiency to the system of compartments which has not yet been attainable; and these compart-

ments admit of further subdivision up to the lower deck, which will be from four to eight feet above water. Separate sets of engines, each with several cylinders, and separate boilers, will be applied to work the screw, distinct from those working the paddle-wheels, so that in the event of temporary, or even permanent derangement of any one of the engines, or of either the paddle-wheels or of the screw, the other engines and propellers would still be available, and the only result would be a proportionate diminution of speed and consumption of fuel, thus rendering the chances of any serious delay almost infinitely remote.

"The ship will become by its construction a beam of strength sufficient to meet any strain to which it can be subjected, and will consist of so many distinct compartments that no local injury, however serious, can affect its buoyancy to any dangerous extent. It will also combine a much greater amount of carrying power or available capacity both for coals, cargo, and passenger accommodation, in proportion to the first cost, than any steamers yet constructed.

"Your Directors having satisfied themselves that the practical and mechanical arrangements proposed are adequate to secure the accomplishment of their object, will now merely state the conclusions at which they have arrived, that commercially the undertaking offers a sound guarantee of success. Their experience and inquiries have satisfied them that such vessels placed on the Calcutta line would, by conveying goods and passengers with much greater expedition and convenience than at present, and at rates so moderate as to preclude competition, prove highly remunerative to the owners.

"Since those inquiries were made, the rapid development of the Australian trade, renders it probable that the line to Australia by the Cape of Good Hope, to which your steamers will be peculiarly adapted, may afford a still more remunerative trade than that to India.

"The navigable distances from Land's-end to Port Philip are as follows, viz.:

	Miles.
Viâ the Cape of Good Hope . .	11,819
„ Cape Horn	12,700
„ Gibraltar, Malta, Alexandria, Aden, Point de Galle, and Singapore, including transit through Egypt . . .	12,034
„ Panama, including transit across the Isthmus . .	12,678

It thus appears *that the ocean route to the focus of Australian connection with Europe is the direct route,* and it is also the route which has the advantage of being free from tolls, and the expense and delay of transshipment, and that it will be impossible for a smaller class of ships by any route, to make the voyage to Australia in so short a time as your vessels.

"Your Directors would have refrained from publishing anything like estimates, but having to meet the predictions of failure made by those interested in the present class of vessels, they think it right to state that the result of their calculations (made on the assumption that the carrying capacity for goods outward should be occupied at the rate of £4 10s. per ton, being considerably below present freights, and only one-half of the cabin room occupied, at rates for first-class passengers £65, second-class £35, and third-class £25, including provisions, giving to each of the respective classes enlarged accommodation, and assuming that only one-third of the vessel's capacity would be occupied on the homeward voyage,) is that, after making the most ample allowance for working expenses, depreciation, wear and tear, and insurance, a surplus remains equal to forty per cent. per annum upon the capital invested. With these prospects, based on sound commercial principles, this Company requires no Government assistance; all that is necessary is that no rival route or rival company shall be subsidised to your prejudice.

"Such are the views and considerations with which your Directors have been led to make their final arrangements. They believe, as they have before stated, that every company and every individual engaged in steam navigation, has gradually become convinced by experience of the advantage of size, and so far as their opportunities and their means enable them, are at the present moment applying the principle, but only by small steps, being to a great degree controlled and limited by their existing establishments, and are acting only on the general view, that large ships can be worked cheaper; and that large steamboats especially, can attain much greater speed and certainty than small.

"This Company, unembarrassed by any previous investment of capital, and commencing operations at a period when a vast increase is taking place in the communication with the most distant parts of the world—and with a Charter which enables it to apply its capital to the most remunerative lines,—is in a situation to build vessels on the most approved construction, and of sufficient size to carry from England, and consequently at the lowest possible price, their fuel, to go to, and, if expedient, to return from, any port in the world, and also to

carry a freight of passengers and cargo yielding a far greater profit in proportion to the working expenses than any steamer hitherto built. Moreover, should it hereafter be found that first-class steam coal can be put on board in Australia, so as to enable vessels to coal there for the home voyage, such an accelerated speed may be attained by a more free expenditure of fuel, as will reduce the time occupied on the voyage to a rate which may dispel the most remote apprehension of injurious competition under any circumstances.

"In conclusion, your Directors desire to state that they believe the vessels of this Company will supply the great desideratum of the day, and will afford the speediest, the safest, most punctual, and most economical means of communication ever devised between this country and her most distant Eastern Colonial possessions."

The Report was adopted by the Company.

LORD PALMERSTON ON MECHANICS' INSTITUTIONS.

We offer no apology for bringing into our columns from the *Times* the following extracts from speeches made by the Home Secretary, on the occasion of his laying the foundation stone of an Athenæum at Melbourne, in Derbyshire, on Saturday last. The broad sympathy with the Industrial classes which they display, and the principles of a lofty but genial morality which they inculcate, will be sure to commend them to our readers, none of whom, we are confident, will be other than glad to see them permanently recorded here, even if they have before perused them elsewhere.

"The advantage of Mechanics' Institutions are so well known and so justly and universally appreciated, that it would be a waste of time, I may say, to dilate upon them; but, nevertheless, it cannot be useless to bear in mind that these institutions contribute not only to the intellectual pleasures of the working classes, but also conduce greatly to their worldly comfort and advantage. With respect to their pleasures, I may say that there are no pleasures really worth having but those which are connected with the intellectual faculties. Pleasures of another kind may, perhaps, be valued for the moment, but they leave no good after them, and they tend frequently rather to degrade and brutalize than to improve and adorn those by whom they are enjoyed. On the other hand, the pleasures of the intellect increase in intensity in proportion as they are enjoyed, and they elevate the persons who cultivate them in the scale of human beings. There is this remarkable difference between the times in which we live and the times which have passed before us. We have, indeed, in these days great discoveries and inventions made, worthy of the intellectual progress of the people who now live. We have in these days invented railways which tend to facilitate communication between towns, provinces, and countries—which tend, as it were, to render Europe one great city, and confer on different nations those advantages of easy communication which heretofore were enjoyed only by the inhabitants of separate towns. That is a great improvement, a great invention, and likely to conduce much to the prosperity, the happiness, and the welfare of mankind. We have in these days applied the power of steam to the navigation of the wide ocean. We have thereby brought countries nearer to each other, which heretofore were separated by passages of many months, and accompanied by great perils and dangers. We have also in these days achieved one of the most splendid triumphs of human genius, because it was not the result of accident, but of laborious investigation and induction—I mean the invention of the electric telegraph — an invention which brings the most distant parts of the world within minutes of each other, and which will, probably, at no distant time, enable us to hold converse with our fellow-subjects in India as quickly as has been done heretofore between parties in adjoining rooms. But, Ladies and Gentlemen, former ages also had their great and important inventions and discoveries. The magnetic needle, for instance, enables man, who before used to creep timidly along the shores of seas, to launch into the wide ocean with a certain security of attaining directly the object of his search—a great invention, which laid the foundation of vast improvements in the existence of mankind. Former ages also invented the art of printing—an art the usefulness of which it would be childish for me to point out to any whom I have now the honour of addressing. Former ages, also, invented gunpowder—an article which, although apparently an instrument for rapid destruction, yet gives to civilization a security and protection against barbarism; and it may be safely affirmed that, if the Romans had had that implement of war, Europe would not have been overrun by those hordes of barbarians who involved the civilized parts of the world in darkness and ignorance for many centuries in consequence of their inroads. But although in ancient times there were men of great knowledge, who invented those wonderful things to which I have alluded — not to mention men of science and literature who have

never since been surpassed—yet in those times knowledge was confined to the few. Now, happily, knowledge is at the command of all; books for imparting instruction of every kind are accessible at a price which places them within the reach of every one; while mechanics' institutions enable the working classes to profit by the exertions, bodily and intellectual, of those who have been the investigators and acquirers of knowledge. The working man may now, without going many yards from his home, acquire that knowledge of distant countries which has been gained by adventurous travellers who have traversed burning deserts or encountered the perils of the stormy ocean—who have visited the Arctic regions or gone to the extreme of the southern world. The mechanic has now, the opportunity of acquiring the result of laborious exertions without ever stirring from his home. The mechanic has now, also, the means of applying to his own purposes all that knowledge which men of deep science have gained by laborious processes, whether in chemistry, or mechanics, or in any other branch of science, and he is enabled to profit, at a small expense, from the investigations which have been so laboriously pursued by others. The mechanic is also by these institutions let into the secrets of Nature, the contemplation of which tends to elevate the mind; and while, on the one hand, it teaches every man how insignificant a portion he is of that great universe which is opened up to him, on the other hand it must also tend to render him more contented with his lot, and more resigned to bear any evils which Providence in its wisdom may ordain him to suffer. The mechanic, in his small room, by the library which is now placed at his command, is enabled to ascertain the wonderful fact, that insects too small to be seen by the naked eye, are yet formed with all the complicated apparatus of larger beings; that although we cannot see them, they have yet joints, limbs, and veins, blood which circulates, and lungs which breathe; that they are constructed, although with a minuteness which is hardly conceivable by man, with all the elaborate contrivances which we find in the larger objects of creation. The mechanic, by means of institutions like the present, is enabled to carry his mind into the most distant regions of the universe. He is enabled not merely to understand the wonderful machinery of that system of which this world forms a part, but he is enabled to carry his views further, and to know that there are visible to those who have the command of the wonderful telescopes and improved optical instruments of the day, 80,000,000 suns, each of them as large, and some of them, in all probability, larger than ours, and all of them surrounded by planets, and containing probably an indefinite number of beings,—all the creation of the same great and inscrutable Power which made this earth. The contemplation of these things must, I think, raise the mind of the mechanic from worldly, low, and vulgar considerations, and tend to direct his mind with fervent devotion towards that great Being from whom he derives his present existence. Well, then, if these institutions are advantageous to the middle age of man, so also is the savings-bank a valuable establishment for declining age. There is no maxim of life more valuable than this, that man should make to-day conducive to to-morrow; that he should be willing to forego the enjoyment, the temptations, the allurements of time present, for the purpose of laying up a store which will insure his comfort in time to come. That is a maxim no less conducive to his comfort and happiness in this world than essential to his well-being hereafter. Those who act on this maxim will find themselves comfortable, wealthy, and respected, while those who, on the other hand, are careless of to-morrow, and think only of to-day, who waste in riotous extravagance or needless pleasure those means which ought to be laid up in store for their future comfort and support, will be sure to lose the respect of their neighbours, and, what is a much greater loss, their own respect for themselves. Well, Ladies and Gentlemen, there is nothing more calculated to encourage these habits of foresight and providence than savings-banks, and I trust that the effects of establishing one in this town will be as beneficial as they have been proved to be in other places where similar institutions have been established. I trust that the working man who, by his skill and industry, is now in receipt of ample wages, instead of squandering them, as many may now be tempted to do, by the want of any proper means of accumulating them—instead, I say, of squandering in dissipation, or, what is worse, in drink or momentary indulgences, a large portion of his earnings, will be induced to lay up a portion of them for the future support of himself and family; and depend upon it, that when once the habit is acquired, when once a man begins to feel that by providence and foresight, by laying up day by day and week by week, he is accumulating a store which will stand him in stead when the rainy day comes—when age and infirmity prevent him from working with the same activity as heretofore,—when once that habit is gained, he will find it a source of pleasure as well as of advantage; he will find it a source of pride to himself to know that he has been accumulating a little store for him-

self; and that he will be a far happier, as well as a far more respected member of society, than he would have been had he squandered daily and weekly in riotous extravagance those means which ought to have been more advantageously laid by. There is not, to any person who has been conversant with public affairs, anything more interesting, and I am sure nothing can be more important, than to assist in the development of the intellectual progress of the inhabitants of this great country. It is a subject of pride to any Englishman to feel how awakened is the spirit of the nation to objects and matters of this kind; and when we see everywhere endeavours spontaneously made by the population of almost every district to cultivate their own minds, and to lay the ground for the cultivation of the intellect of the rising generation, it is a contemplation, I think, which is not only grateful to every lover of his fellow-men, but which is peculiarly gratifying to an Englishman, because he feels that thereby he is laying the surest foundation for the prosperity, the greatness, and the happiness of his country. Gentlemen, I see before me a motto peculiarly appropriate to the occasion for which we are met—a motto which, I trust, will lead naturally to the toast with which I shall beg to conclude,—"Prosperity to the Institution of which we have this day laid the foundation." That motto, I see, is—"Knowledge is Power." Now, if any axiom is more true than another, it is the axiom which I see before me; for it is by knowledge that man is enabled to coerce to his service the elements of Nature; it is by knowledge that he is enabled to make the wild winds of Heaven conducive to the purposes of commerce; it is by knowledge that he is enabled to reduce the almost indescribable power of steam to serve him like a slave; it is by knowledge that we have lately been enabled to bring the destructive element of lightning to our service, and to make it subservient to the most ordinary and daily purposes of human existence. But there is one power which knowledge gives us, which, perhaps, for each individual, is still more valuable than those which I have alluded to—for knowledge gives to man power over himself. It is by knowledge that men are enabled to control their passions, to regulate their conduct, and to devote their energies and exertions to the welfare of themselves, their families, their neighbours, and their country; and therefore, of the powers which knowledge affords to man, there is none which is, perhaps, more valuable, none which comes more home to our business and our bosoms than the power which knowledge confers on him to govern and regulate himself."

EXPERIMENTS WITH CAPTAIN NORTON'S BLASTING CARTRIDGES.

The Master-General of the Ordnance having given instructions to the officers of the Royal Engineers, Captains Hadden and Synge, to examine and report on the efficiency of Captain Norton's percussion cartridge for blasting, operations were lately commenced in the quarries on Spike Island, with the most satisfactory results. Captain Norton has received letters from England, Wales, and America for the use of his cartridges; his course is to grant licenses for a royalty to those applying—a description of the cartridge has already appeared in print, but as the course of practice has suggested new matter, we give the last addenda.

In boring horizontally, or with an inclination downwards, clay may be met with in the narrow fork between the limbs of the block, but boring through this, solid timber is again entered in the opposite limb. After the hole is bored with the auger, its entrance should be widened for one-third the way with a rimer—this admits of the iron rammer being placed in its proper position, when the blow from the fallen block above will impel it perfectly air-tight on the head of the cartridge. By causing the wooden block, suspended by a rope or supported on an inclined plane, to strike the iron rammer in a slight degree obliquely, a section of the root of a tree, or of a rock, can be separated in the direction required in like manner, and more efficiently than by the powerful leverage of a long crowbar, because the severing power of the explosion and leverage of the iron rammer act simultaneously. In blasting rocks, either above or below water, a cylindrical plug of deal, or other wood, about three inches long, and the same diameter as the bore, may be used, the plug having on its lower end a broad-headed iron nail, *cone-formed*, this will be driven into the plug by the force of the blow above, and the explosion of the cartridge below, thus forming a perfect condensed tamping—the tamping and cartridge may be all in one, thus making one action or motion instead of two. The cartridge may have but one percussion cap, and that at its lower end, which need not be put on till it is to be used. They can be packed for carriage with perfect safety, and may be made water-proof by a coating of Japan varnish, such as is used in varnishing iron and other metal.

Three different modifications of this cartridge were tested in the quarries on Spike Island, each of which succeeded perfectly.

In blasting, in the ordinary way, with a

clay, pounded brick, or sand tamping, if a misfire occurs, it is necessary to remove the tamping, in order to insert a fresh furze or priming, but with the percussion cartridge, if a misfire takes place, it is only necessary to drop a short cartridge upon the one that missed fire, and the ignition of the upper cartridge will also fire that below it. The percussion appliance fitted into the wooden head, or tamping, of the cartridge, and charged with the composition that lucifer-matches are primed with, is the same as that for the rifle percussion shell, illustrated by a diagram, No. 13 in Col. Beamish's Appendix to Col. Chesney's Lecture on Fire-arms. The head of the cartridge is, in fact, a wooden percussion shell, striking, or being struck, "point foremost." The percussion head, or wooden tamping, may be charged by dropping a few heads of Bell's lucifers into the hollow chamber, then pouring over them about a drachm of gunpowder; the wooden plug, fitting air-tight, is then inserted, projecting about an inch; the blow on the plug ignites the charge, bursts the tamping, and fires the cartridge, something on the principle of the brass tube and piston for igniting the German amedu, or tinder. In order to prevent the block from falling off the head of the iron rammer, a deep hoop of sheet-iron is secured to its lower end, so that it falls on the iron rammer like an extinguisher or inverted bucket.

Another modification of the cartridge by which it is fired in the centre, is this—half the charge of powder is poured into the hole bored in the root of a tree, or a rock, a small pill-box, about the size of a hazel-nut, and containing half a dozen lucifer heads of Bell's matches, together with a little fine gunpowder, and pounded glass, is dropped on the gunpowder, the remainder of the powder of the required charge is then poured in, and the blow of the iron or wooden rammer crushes the pellet and fires the charge. On one occasion the experiments were carried on without using a triangle for suspending the wooden block, and in place of it the iron rammer had the block fixed on its head; a steel pin passed through the iron rammer and supported it in the bore of the rock, a rope was attached to the pin, and when the men retired to a safe distance, the man who held the rope drew out the pin, when the rammer falling on the head of the cartridge fired it; this is a more simple way of causing the rammer to fire the cartridge than that of the triangle.

AN IMPROVED SCREW-PROPELLER.

Mr. Alexander Moore, foreman of shipwrights, Royal Dockyard, Devonport, formerly of Sheerness, has received a bronze medal from the "Royal Cornwall Polytechnic Society" for the invention of a screw-propeller, composed of two precisely similar parts, which dovetail together at the boss. It is considered to possess the following improvements:

First. In the event of one of the blades being broken by striking against any object, or being injured by a shot, the fractured half can be replaced without destroying the whole propeller, and consequently a very considerable saving would be effected in making good the damage.

Second. It can be taken to pieces and stowed in any convenient part of the hold, instead of being placed on the weather deck, thereby relieving the ship of top-hamper, and reducing the quantity of ballast necessary for her stability.

Third. In the event of its being necessary to ship the spare propeller, with which it is proposed each ship should be provided, it can be transported along the deck in two pieces with much greater facility than in one.

Fourth. Should one-half of the propeller be broken in a foreign port, the other half can be used as a model for casting a new one—the two halves being in shape exactly similar.

Fifth. It can be put together in a very short space of time; and from the manner in which it is secured by dovetails and steel keys (the latter being capped over to prevent galvanic action), with a small increase of metal about the boss, will be found to possess the requisite strength.

While acknowledging the existence of these important advantages, we are afraid that a suspected deficiency of strength will operate against its general adoption.

Lectures on Quaternions, containing a Systematic Statement of a New Mathematical Method; with numerous Illustrative Diagrams, and with some Geometrical and Physical Applications. By Sir William Rowan Hamilton, LL.D, M.R.I.A., Fellow of the American Society of Arts and Sciences, &c., &c., and Royal Astronomer of Ireland. Dublin: Hodges and Smith. London: Whittaker and Co. Cambridge; Macmillan and Co.

That this volume contains the development of a New Mathematical Method is sufficient of itself to intimate its high importance; this, however, is further guaran-

teed by the eminence and fame of the author. There are two methods of procedure, either of which may be selected by the reviewer of such a work. The former of these is simple, and consists in gathering a few general ideas relating to the author's object in writing the book, either from the Preface or the Table of Contents, or from both, and then reproducing the information thus acquired with all available semblances of profundity, interspersing it with certain adulatory epithets assigned to the writer, which, belonging to every accredited philosopher, can hardly be misapplied under the circumstances: a short ornamental dissertation upon the sublimity of science in general might be found to add to the effect of the process. The latter is more laborious, and includes; *first*, the studious examination of at least the primary definitions and leading investigations of the book itself; and, *secondly*, a careful *résumé* of these and an equitable decision upon them. It is to this latter method that we purpose to apply ourselves; and if it should occur that in some cases we are seen to object either to the ideas advanced by Sir W. Hamilton, or to the symbolical expression of his ideas, we desire it to be understood that it is from no want of proper deference to so high an authority as the author, much less from the indulgence of a complaining temper, that we express our dissent; but rather from the knowledge that in matters of pure science —where, as we shall have to show, principles are evolved not from observations of the phenomena of Nature, nor from the esteemed traditions of men, but from the independent exercises of individual minds — allegiance to aught else than Truth itself can neither be demanded nor desired. But this preliminary explanation will probably be less needful to no one than to the author, who doubtless understands better than we the mental isolation and independence that are indispensably necessary to him who has to estimate the magnitude and explore the path of a new luminary in the firmament of science.

Such a subject as this naturally excites a revival of some of those first principles which form the basis of mathematical systems, a brief and partial recurrence to those real relations of time, number, and space, which it is the practice of most modern philosophers to esteem as the *necessary* adjuncts of the existing constitution of the Mind; and we the more readily follow the course thus indicated, when we remember that good and wise men have been prone to accustom themselves both to the verification of these fundamental relations and to the extension of the sciences erected upon them, not only for the purpose of augmenting and improving the domains of Truth, but also that they might find in these engagements a pure intellectual discipline, which should eminently prepare them for the intercourse and occupations of life. Nor was this the case only among those refined and early nations, of which the Greeks may for the moment be taken as the type, who found in the pursuits of speculative truth that exhilaration and delight which later nations are wont to seek in coarser and less ennobling employments; the like disposition has also been exhibited throughout the whole of the middle and modern ages, although certainly not with uniform vigour; and it is well known that in our own country, at the present time, a certain familiarity with the deductive sciences, in particular, with the Elements of Euclid, is considered an almost essential part of the early education of our authors, our senators, and our divines.

Persons of a thoughtful habit of mind are not long in discovering two distinct classes, in one or the other of which every truth ranges itself. The first class is distinguished by the fact that it embraces those truths only which are derived purely and solely from the mind of man itself: the second is characterized by the condition that the truths belonging to it are developed by the intercourse of the mind with things external. The distinction between these two classes or kinds of truth, has been recognised throughout the records of philosophy; but so evident are they, notwithstanding sundry attempts to prove the derivation of all knowledge from experience, that we think we need hardly plead the fact that Aristotle and other philosophers of antiquity both remarked and dwelt upon them, in order to win from any the admission of their existence. And as truths are thus divided into two classes, so also are the sciences constructed of them; and accordingly we find, that while on the one hand man is compelled to interrogate the phenomena of the world, in order to discover the laws by which the existing universe is ruled, on the other we find that without at all attending to the displays of Nature, the mind has of itself put forth systems of necessary truth, to which no natural law can possibly be opposed. To the sciences thus developed by the mind alone, the term "pure" has been applied, for the purpose of distinguishing them from those which have relation to the operations of Nature, and which are therefore denominated "mixed." Geometry, conic sections, differential calculus, and algebra are examples of the former class; mechanics, chemistry, optics, and astronomy, of the latter. It is to a hasty consideration of the nature of the pure sciences alone that we shall now

advance, leaving the other class for a future occasion, should such occur.

Every pure science is an edifice more or less completely erected upon a basis composed wholly of certain definitions and axioms, which are derived, as we have said, immediately from the mind. Demonstration and deduction are the instruments employed in rearing the edifice; the architectural process is simply this: the mind puts forth certain truths with such definiteness and authority that each man is not only able to declare their existence, but is also competent to pronounce them *necessary*; that is, he can assert not merely that they *do*, but also that they *must* exist: these truths, accepted as definitions and axioms, are then brought together, arranged, and combined by the reason into what are commonly termed propositions, which in their turn are again combined by means of demonstrative operations into other and more complex propositions, and thus the process is continued. Now, since the mind not only pronounces the definitions and axioms true, but also equally affirms the integrity of the faculty which operates upon them, therefore every proposition educed as above described necessarily carries with it the sanction and authority of the mind also; and this is true, however recondite the results may be to which we are thus conducted. Moreover, it will also be seen that since by the process of thus successively deducing and inferring new truths from others already known, no new principles are included, no new ideas are involved, therefore every proposition thus developed, by deductions no matter how often repeated, must in reality be *wholly contained* in the definitions and axioms from which we started; a consideration which requires to be stated here, although it more naturally belongs to the province of logic. Hence we see that however magnificent such a science may appear when expanded into vast and splendid proportions, it depends altogether upon a few plain elementary truths for all its stability and grandeur. This explains the fact, that in Egypt, more than two thousand years ago, Euclid could do so much towards the perfecting of the science of geometry. The work needed nothing from experience to advance it; a clear and energetic intellect was sufficient for its accomplishment. It is very different with the mixed sciences. How many majestic minds have been exercised, for instance, upon astronomy alone? Aristotle, Hipparchus, Ptolemy, Copernicus, Galileo, Kepler, Tycho, Newton, and a thousand others of eminence, had devoted themselves to the exploration of the celestial phenomena before the heavenly motions were at all fully discovered, and their laws made known. Step by step this science had to advance from the obscurity in which it existed when first approached by the Egyptians, the Chaldeans, and the Greeks; theories were supplanted by other theories, and speculations by newer speculations; experiences were accumulated and arranged; facts were collated and classified; and although we have no longer, while discoursing of astronomy, to waver and falter over our opinions, as had Copernicus, when submitting his discoveries to the Roman pontiff, yet the fundamental truths of the science are even now less certain than those deductions of Euclid, which are the farthest removed from the elementary principles out of which they arise, because these are absolute and necessary, while the former are only accepted as the best interpretations of the physical world.

These considerations serve to show that the pure sciences are really reducible to very small dimensions and to very narrow limits, and consequently we gather courage, and are enabled to look steadily and hopefully at ponderous volumes, from which we should otherwise, in all probability, recoil. But it must not be concluded from this that we are forgetful of the difficulties and complexities which soon beset us when we enter upon these sciences. While the objects of consideration are lessened in number, it must be remembered that those remaining are not deficient in subtlety. We may, in support of this, again refer to Euclid's geometry, which is perhaps the least obscure of any. We are aware that some persons write and speak of "Euclid's Elements" as if it were the most plain and prosaic book in the world; as if it were of all the most removed from the sphere of the imagination. And yet we assert, in opposition to this, (of course not pretending to any orignality in making the assertion) that for a true comprehension of the geometry of Euclid, a mind is needed that is capable both of raising itself to, and sustaining itself in, those regions where the powers of sense are inoperative, and where the imagination alone can find scope and employment. We know well that thousands study the science, and study it with considerable profit, who cannot be supposed to possess imaginative power. But to them the study is of value, simply as a practice in syllogistic reasoning, or as furnishing a convenient instrument to be employed in subsequent scientific manipulations. It is true that men may, in a certain loose sense, be said to know the theorems and problems of Euclid who have never once considered them without pictorial aids. In such cases, however, the real nature of geometrical

truths is in no way understood, because they are altogether independent of, and lie beyond, all physical diagrams, which are but rude helps to the reception of such truths by the mind.

The definitions and axioms of Euclid being however once justly and truly comprehened, all the rest is comparatively easy. But this is not the case with algebra, or the science in which the relations of quantities are represented by letters or analogous characters. In this certain difficulties arise from the employment of negative quantities and their roots. The very form of a negative quantiiy, $(-a)$ for instance, has a somewhat startling effect when written in full, thus $(o-a.)$ The value of it evidently is that quantity to which, if a be added, o (zero) will be produced; and keeping this in mind, there is not much difficulty experienced in verifying the various propositions concerning the symbol $(-)$ that are familiarly met with in algebraical works; and among them this, that no positive or negative quantity being squared can produce a negative quantity; from which it follows that the square root of such a quantity can be neither positive nor negative. Consequently, in algebraical investigations, when we are conducted by any operations or suppositions to a result of the form $\sqrt{(-a)}$, this is immediately rejected, and the operation or supposition is held to be impossible. In such a case the square root of the negative quantity is very properly denominated *impossible* or *imaginary*. But all this is quite different when we make an application of algebra to analytical geometry of two dimensions. Here we find that the square root of a negative quantity may be extracted, because there is a quantity which, when squared, produces a negative quantity, and therefore $\sqrt{(-1)}$ has a real signification. Now, Sir W. Hamilton proposes to extend this signification to geometry of three dimensions, or solid geometry. It is evident that we shall here require two heterogeneous symbols $(i,\ j)$ such that $i^2=-1$, and $j^2=-1$, (two equations which at first sight certainly seem incompatible with the heterogenity of i and j.) Preparatory, therefore, to the examination of his work, we think it will be well to exhibit the meaning attached to $\sqrt{(-1)}$ in plane analytical geometry as it has been developed by different writers who have bestowed their labours upon the subject.

Take the straight line CAB, fig. 1, and according to a common convention, suppose,

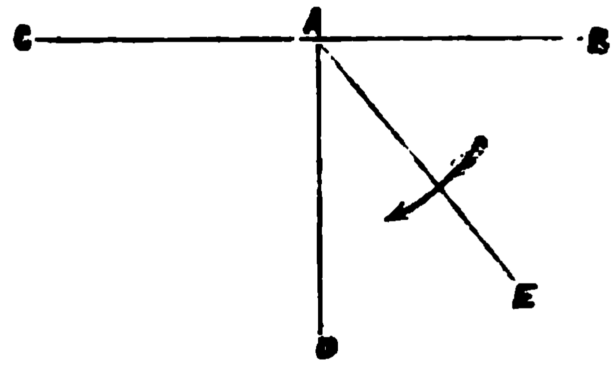
$$AB=+a,\ AC=-a,$$

and, therefore,

$$AC=+a\times(-1)=AB\times(-1).$$

Here (-1) may be regarded as an operation, the action of which on AB in the form of a multiplier has reversed the direction of AB; or as we may suppose, has caused AB to revolve in the direction of the arrow

Fig. 1.



from the position it at first occupied through two right angles to that of AC. Now, we may imagine the same thing to be effected by two separate and distinct, but similar, and, upon the whole, equal operations; the first causing AB to revolve from AB to AD through one right angle; and the second carrying it on from AD to AC through another right angle. Let the symbol i represent an operation that would produce either of these results, just as (-1) represents one that changes AB to AC. Then we have

$$AD=a\times i$$
$$AC=a\times i\times i=a\times i^2$$

But $AC=a\times(-1)$;

therefore $i^2=(-1)$

or $i=\sqrt{(-1)}$.

From this we see that $a\sqrt{(-1)}$ represents the straight line AD; that is a line whose length is a, and whose direction is perpendicular to that in which $+a$ is measured.

(*To be continued.*)

The Engineer and Machinist's Drawing Book; a Complete Course of Instruction for the Practical Engineer. Parts 5 and 6. Blackie and Son.

Railway Machinery; a Treatise on the Mechanical Engineering of Railways. By DAVID KINNEAR CLARK. Part 19. Blackie and Son.

THE present Parts will sustain the excellent characters that these works have already acquired. The methods of describing elementary forms are concluded in Part 5 of the "Drawing Book," which then takes up the subject of geometrical projection, that evidently requires considerable care. This is continued throughout Part 6, and is written in a style far more lucid and exact than those ordinarily employed in practical trea-

tises, although certainly not with mathematical precision, which could hardly be expected, and is perhaps not very anxiously to be desired in a work written primarily for the instruction of engineers. The article has, however, the singular merit of being written with clearness and perspicuity.

Mr. Clark in his "Railway Machinery" is, as usual, very careful in detailing descriptions of those minute yet highly important parts of various machines, which would escape the notice of a less informed author. He publishes in this Part an interesting and valuable article on Boilers, and the commencement of an analogous one on the carriages of boilers. We confidently recommend his work to all engaged in any of the departments of railway engineering.

STRINGFELLOW'S GALVANIC BATTERY.

A description of this battery was published in our last volume, page 449 (No. 1556). The favourable opinion we then expressed of it has been further confirmed by the following notice of it, which we extract from the *Association Medical Journal.*

We received, some weeks ago, one of these machines from the inventor, and have now much pleasure in reporting upon it. Stringfellow's arrangement is the most perfect for physiological purposes which has ever been contrived. In size it does not exceed a lady's card-case. Its principle is the same as Pulvermacher's chain; but it is more effective and energetic, on account of,

First. The very small obstruction offered to the passage of the current, from the perfect connection of the metallic element, instead of their being hung on loops.

Second. The large extent of the generating or electro-positive element, and its very close proximity to the conducting or electro-negative element; thus reducing to a minimum the opposition offered to the current flowing through the exciting fluid.

Third. The extreme compactness of the apparatus; twenty-two compound elements entering, after being excited, into a common card-case, and evolving a current capable of decomposing water, and giving smart shocks for neaaly half an hour; evaporation being prevented by the ingenious plan of inclosing the battery in a card-case.

The remarkable fact connected with this battery, of four elements, *moistened with water only*, being capable of decomposing distilled water, is worth attention, and can only be explained by the almost complete absence of all opposing causes interfering with the passage of the current; hence, *all the electricity excited is thrown into current, and none lost;* whereas, in some pieces of apparatus of this kind, a great quantity is lost.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

John Richard Cochran, of Glasgow, Lanark, North Britain, manufacturer. *Improvements in the manufacture or production of ornamental or figured fabrics.* Patent dated February 22, 1853. (No. 453.)

This invention relates chiefly to the manufacture of figured fabrics of the *lappet* class, in which the device or pattern on the goods is formed by the action of lappet-wheels or other similar contrivances, in laying the whip or pattern-threads upon the surface of the goods, and binding down the same with the weft-threads. Such yarn or figure-threads have hitherto been always beamed on rolls previous to weaving, the rolls being attached to the loom, and the yarn taken from them as required. But in this invention the cops of the whip-yarn are taken directly to the loom, and arranged in suitable holding-frames, and the yarn is unwound directly from the cops as the weaving proceeds. Thus the usual intervening processes which the whip undergoes between the doubling, or twisting, and weaving, are dispensed with, and the waste is reduced; or, by another mode, the bobbins of yarn are taken to the loom and held there in a suitable frame instead of the cops; and in both cases, whether the cops or bobbins are applied in this way, each line or frame of threads is passed round a paced roller, so as to give an equal uniform tension to all the threads during the weaving action; or the pacing may be effected in other ways.

Claims.—1. The general arrangement and construction of apparatus for the manufacture of ornamental or figured fabrics, as described.

2. The mode of weaving the whip-yarns of figured or ornamental fabrics direct from the cops.

3. The mode of weaving figured fabrics of the class before described by means of whip-yarn contained on bobbins, or holders, of a similar nature.

4. The combination of cop or bobbin-holders with the looms employed for weaving figured fabrics, as described.

John Smith, of Uxbridge, Middlesex, agricultural engineer. *Improvements in machinery for raising and forcing water and*

other fluids. Patent dated February 23, 1853. (No. 455.)

The inventor describes and claims a machine consisting of a metallic circular trough or groove answering to the barrel or chamber of an ordinary pump, closed or covered by a water-tight diaphragm of some flexible material, which at any convenient part of the circle is stopped down to the hollow of the groove. An opening is made on each side of this stop, and one or more rollers are mounted upon arms radiating from a central shaft or axis, and are caused to travel round in the circular groove, pressing down the flexible diaphragm, when the fluid which is drawn in through the opening on that side of the stop from which the roller is moving, will be forced out at the opening on the other side of the stop towards which the rollers are advancing.

Edwin Stanley Brookes, Joseph Black, George Stevenson, and William Jones, all of Loughborough, Leicester. *Improvements in machinery for the manufacture of looped fabrics*. Patent dated February 23, 1853. (No. 456.)

This invention relates to the construction of a machine for manufacturing looped fabrics, in which the rib loop of the fabric is formed while the work is between the end of the beard and the end of the stem of the frame-needles; that is, the end of the stem contrary to that to which the beard is attached. The machine is also intended to work the course faster; to work the ribbed course with needles under the arch of the frame-sinker; to give the wire-presser and frame-presser only one movement to the course, and to work the ribbed course while the jacks are drawing, instead of stopping at the needle-heads, when the frame-course is finished as hitherto practised.

Reuben Plant, of Brierly-hill, Staffordshire. *Improvements in safety-lamps*. Patent dated February 23, 1853. (No. 458.)

The inventor proposes to employ white or light-coloured wire in the construction of safety-lamps, in order to avoid as much as possible interference with the transmission of the light from within.

Robert Milligan, of Harden-mills, Bingley, York. *Improvements in apparatus for washing slivers of wool*. Patent dated February 23, 1853. (No. 459.)

This invention relates to the washing of wools which will not well hold together in the form of sliver—such as mohair and alpaca wools—and consists in aiding this process by employing endless webs or bands by which the slivers are supported in their passage into and out of the fluid.

Samuel Cunliffe Lister, of Bradford, York, manufacturer. *Improvements in treating soapsuds*. Patent dated February 23, 1853. (No. 460.)

This invention relates to a method of evaporating or concentrating soapsuds by the employment of extensive revolving surfaces or discs placed side by side, which, being partly immersed in the suds, carry up on their surfaces, as they revolve, thin films of the fluid, which films are then acted upon by streams of air.

Asa Willard, of St. John, New Brunswick, British North America. *Improvements in machines for manufacturing butter, to be called "A. Willard's Butter Machine."* Patent dated February 23, 1853. (No 461.)

Claims.—The combination of one or more fluted rollers, with one or more floats to operate so as not only to aid in the process of separating the butter from the cream or butter-milk, but afterwards, when the dasher is reversed, to throw into ridges the butter spread on the bottom of the floats.

2. The giving a longitudinal hollow to each float, for the purpose of gathering the spread butter towards the centre.

3. A peculiar mode described of giving motion to the dasher.

Adam Cyrus Engert, of Mora-place, City-road, Middlesex, manufacturer. *Improvements in joints for the sticks of parasols, and other like purposes*. Patent dated February 23, 1853. (No. 462.)

This invention consists in the construction of a tubular spring joint, which requires no adjustment of parts when opened or closed, but simply the exertion of a small force by the hand. The inventor proposes to apply the joint not only to parasol handles, but also to the attaching of knife blades to their handles, and a variety of other useful purposes, and has stated his claim accordingly.

John Green, of 21, York-buildings, New-road, Marylebone, Middlesex. *The more economic, speedy, convenient, and in every respect superior system of cooking to any now in use, and which he designates "Green's Economical Self-basting Cooking Apparatus."* Patent dated February 24, 1853. (No. 463.)

The operation of cooking is aided in this invention by the employment of a moveable reflector fitting a semicircular roasting screen formed with a deep flange underneath, and a door therein for the purpose of watching the progress of the roasting, and a screw shifting up and down for the regulation of the heat by the adjustment of the space between the joint roasting and the fire. The inventor also employs a self-acting pan which bastes the joint—a dripping-pan so arranged as to replenish the basting-pan—a heat-conductor fitted with sliding

and hanging hooks, and a moving damper for the regulation of heat.

WILLIAM SPENCE, of Chancery-lane, Middlesex. *Certain improvements in machines for threshing and winnowing corn and other agricultural produce.* (A communication.) Patent dated February 24, 1853. (No. 464.)

Claims.—The adaptation and application to threshing and winnowing machines; 1. Of an open travelling apron. 2. Of a rack or open floor. 3. Of a receptacle whereby the matters that have not been duly operated upon are passed and conveyed back into the machine, as described.

HENRY WALMSLEY, of Frailsworth, near Manchester, Lancaster, silk manufacturer, and THOMAS CRITCHLEY, of the same place, machine maker. *Improvements in machinery or apparatus for retarding or stopping railway trains, which machinery or apparatus is also applicable as a signal or communication from one part of the train to the other.* Patent dated February 24, 1853. (No. 465.)

The inventors explain a method of applying the common or improved breaks to all the wheels of railway carriages by means of a double or single screw acting upon a strong spring extending from one break to the other. To connect the breaks of one carriage to those of another, a rod is fixed longitudinally under each carriage with slots at each end, in which work compound universal joints. The free action of the connecting-rods is thus allowed when the train is turning curves. An extension of the arrangement is made for the purpose of communicating signals.

WILLIAM JOHNSON, of Lincoln's-inn Fields, Middlesex, civil engineer. *Improvements in the treatment or manufacture of caoutchouc.* Patent dated February 24, 1853. (No. 467.)

This invention relates in the first place to the treatment of the raw juice of the caoutchouc plant in such manner that it shall remain in a fluid state without deterioration, thus: Shortly after the milk or juice is collected, it is strained, and has then added to it a quantity of the concentrated liquor of ammonia, or any other ammoniacal matter, or any combination of nitrogen and carbon, and the two substances are well mixed together. It will then remain in a white fluid state fit for transportation and use if kept in air-tight vessels. In the second place, it relates to the production of a new article of manufacture formed by the evaporation of the mixture just described.

Claims.—1. The mode of treating the milk or juice of the caoutchouc or India rubber-tree, as described.

2. The use of the concentrated liquor of ammonia, or ammoniacal matter in any other form, or any combination of nitrogen and carbon in connection with caoutchouc, milk, or juice.

THOMAS DE LA RUE, of Bunhill-row, Middlesex, manfacturer. *Improvements in producing ornamental surfaces to paper or other substances.* Patent dated February 24, 1853. (No. 469.)

This invention consists in the production of films on paper and other substances by dipping them into, or spreading on them, a solution of gun-cotton or other similar product called xyloidine, dissolved in ether or some other solvent or solvents.

Claim.—The application of a solution of xyloidine to the production of iridescent surfaces on paper and other substances.

EMILE ADOLPHE HERRMANN, of 1, New Bond-street, London, gentleman. *Certain improvements in machinery for manufacturing woollen cloths.* (A communication.) Patent dated February 24, 1853. (No. 470.)

This invention refers to a method of giving to the main cylinder of a napping machine such a motion that it acts twice upon the cloth to be napped at each of its revolutions, and naps the cloth by another oscillating motion.

Claims.—1. The napping cloth on two sides by one turn of the cylinder, as described.

2. The oscillating of the napping cylinder, as described.

JAMES LAWRENCE, of Colnbrook, Middlesex, brewer. *Improvements in the drying or preparation of malt, meal-seeds, corn, and other grain.* Patent dated February 24, 1853. (No. 471.)

This invention consists in passing the substances enumerated in the title through a heated tube so constructed as to cause their different particles to impinge upon, or come in contact with, the heated surface, and so become gradually dried. The agitation is produced by means of a fan, or of studs spirally arranged upon and around a solid or hollow spindle or shaft.

THOMAS BROWN JORDAN, of New Cross, Kent, engineer. *Improvements in machinery for planing slate.* Patent dated February 24, 1853. (No. 472.)

A full description of this invention forms the first article of our present Number.

FRANCIS PRESTON, of Manchester, Lancaster, spindle and flyer-maker. *Improvements in the manufacture of certain parts of machinery to be used in preparing and spinning cotton or other fibrous material.* Patent dated February 25, 1853. (No. 473.)

This invention consists, in the *first* place, in casting the lower parts of the legs of the flyers closer together than the upper part, in consequence of which the expansion

resulting from the operation of grinding and polishing brings the legs of the flyer parallel, or nearly parallel to each other, and little or no setting is then required; and, in the *second* place in making the buttons of spindles used in machinery for spinning of malleable cast-iron.

The above improvements are comprised in the inventor's claims.

JOHN HYNAM, of Wilson-street, Finsbury, Middlesex, chemical-light manufacturer. *Improvements in the mode of manufacturing wax or composite tapers, and in the machinery or apparatus for that purpose.* Patent dated February 25, 1853. (No. 474.)

The inventor describes certain machinery to be employed in cutting the tapers off to the required lengths and depositing them in frames ready for dipping. The material of which the tapers are to be formed having been prepared in the usual manner, is wound upon a series of drums or large bobbins, from whence it passes through suitable guides and between a pair of rollers, which is caused to perform only a partial revolution. The object of the rollers is to draw from the bobbins the prepared material for the wax taper, and pass it through a perforated plate, on the underside of which there is a knife that cuts the projecting ends of the wax or composition material as it passes through the plate into the lengths required for the tapers, which are then deposited in a frame for dipping, after which they are dried and packed in the usual manner.

Claim.—The combination of parts forming a machine for simultaneously inserting between the spaces of the frame, and cutting off to the required lengths from the prepared material, wax or composite tapers, commonly called "Vestas."

BENJAMIN PRICE, of Fieldgate-street, Whitechapel, Middlesex, furnace-builder. *Certain improvements in the construction of furnaces or flues of steam boilers, coppers, and other like vessels for heating or evaporating liquids.* Patent dated February 25, 1853. (No. 475.)

The object of this invention is to obtain a more perfect combination of the gases and other products of combustion during their passage through the flues. This is effected by constructing at one or both ends of the boiler, or in some part of the flues, one or more chambers or receptacles, where the flame and gases may unite and expand.

Claim.—The construction of flues of stationary and marine boilers with one or more chambers, as described.

JOHN GRIST, of Hoxton, Middlesex, engineer. *Improvements in machinery for the manufacture of casks, barrels, and other similar vessels.* Patent dated February 25, 1853 (No. 476.)

Claims.—1. Arranging the cutters in jointing-machines one in advance of the other, and causing the centre line of the shaft carrying such cutters to correspond to the centre line of the shaft carrying the feed-rollers. Also forming the feed-rollers of a conical shape, and mounting them in bearings upon moveable plates, as described.

2. The chiming and creasing of each and every stave separately, and before several staves have been formed into a cask.

3. The trussing of casks, barrels, and other similar vessels from the inside, together with a particular arrangement of machinery for the purpose, as described.

4 A certain arrangement of levers, in connection with the screws and gearing, for hooping or close trussing such vessels.

5. Placing the cutters used in bevelling the heads of casks diametrically opposite to each other, together with arrangements of apparatus for causing the cutters to recede and advance, as described.

6. Certain apparatus for boring the bung-holes of casks, &c.

7. Bevelling or "flewing" the hoops of casks, &c., by means of tilt-hammers, arranged and working as described.

WILLIAM SYMINGTON, of 41, Gracechurch-street. *Improvements in preserving milk and other fluids.* Patent dated February 25, 1853. (No. 477.)

According to this invention, the milk or other fluid is placed in an open vessel, and is kept heated by a steam jacket or otherwise. The vessel in which the milk or other fluid is to be preserved, is provided with a short tube of soft metal, to which is attached by suitable coupling a long tube which is introduced into the open vessel containing the liquid. Heat is then applied to the vessel which is to receive the fluid, by which means the air is driven from it, and ascends through the fluid; this latter then descends and fills the lower vessel as it is cooled. The short tube is then hermetically closed.

Claim.—The combined means described of preserving milk and other fluids.

JOHN PALMER DE LA FONS, of 13, Carlton-hill, St. John's Wood, Middlesex. *Improvements in applying skids or drags to omnibuses.* Patent dated February 25, 1853. (No. 478.)

The object of this invention is "to relieve the horses from the most serious part of their labour, viz., checking the momentum of the carriage when stopping to take up or put down passengers." The skid is placed upon one end of a bent lever, the other end of which carries a vertical rod, which the

conductor can raise or lower, and so skid the wheel. A stop is formed upon the side of the vertical rod, for the purpose of keeping the skid raised when not in use.

No claims specified.

HENRY MARTYN NICHOLLS, of 39, Gower-place, Euston-square, Middlesex. *Improvements in emission or reaction-engines.* Patent dated February 25, 1853. (No. 480.)

This invention consists in causing the steam to flow from the cylinder into a chamber or chambers attached to it, instead of passing it immediately into the condenser or atmosphere. When the chambers have become full the passage to the cylinder is closed, and the steam then escapes of itself into the vacuum or atmosphere.

Claim.—The construction of engines in such manner that the flow of the fluid may be rendered intermitting in the place of being constant.

ANTONIO FIDELE COSSUS, of University-street, Middlesex. *Improvements in filters.* Patent dated February 25, 1853. (No. 481.)

This invention consists in making a cylindrical or other open frame into certain openings of which pieces of carefully burned charcoal, cut across the grain, are fixed, and in then placing this frame in a close cylinder or other cistern, into which the water to be filtered is introduced.

Claim.—The mode described of employing charcoal in the construction of filters.

JOHN GEORGE TAYLOR, of King-street, Cheapside, London, wholesale jeweller. *Improvements in ornamental fastenings for dress.* Patent dated February 25, 1853. (No. 482.)

This invention relates to various arrangements of fastenings, such as are used for securing brooches, &c.

Claims.—1. The general arrangement of dress and ornamental fastening, as described.

2. The application to brooches and dress-fastenings of a heart or duplex-curved spring-catch in combination with a sliding pin-detent movement.

3. The application to dress-fastenings of a sliding socket joint-piece, for the butt-end of the holding pin.

4. A mode of fastening the joint action of brooch and dress-fastenings by an eccentric holding-piece on the butt end of the pin.

5. The application of metallic or other springs, for the purpose of pressing forward the holding-pins longitudinally to keep them engaged in their catches.

6. The application of an open or swivel joint-catch, for retaining the holding point of the pin.

7. The mode of arranging the holding-pins by means of a joint, to permit the pin to swing round into an open spring catch.

JOSEPH BRANDEIS, of Great Gower-street, Middlesex, sugar refiner. *Improvements in the manufacture and refining of sugar.* Patent dated February 26, 1853. (No. 487.)

Claim.—The use of shale or schist charcoal for separating the excess of lead, tin, zinc, or bismuth, from solutions of sugar which have been defecated by salts or compounds of such metals.

The Honourable JAMES SINCLAIR, commonly called Lord Berriedale, of 17, Hill-street, Middlesex. *Improvements in weaving.* Patent dated Feb. 26, 1853. (No. 491.)

This invention relates to the construction and arrangement of a loom for the manufacture of narrow goods of all kinds, such as tapes, ribbons, and other articles, where each loom contains an extended series of shuttles, or weft-conductors, working in a continuous line, and all or most of them in action at once upon separate lines of fabric. The object of it is to arrange the shuttles in such manner that any one of them may be stopped and taken out without disturbing the remainder or stopping the loom.

Claims.—1. The general arrangement and construction of looms for weaving narrow fabrics, as described.

2. The use in narrow fabric looms of two or more parrallel shuttle-races for each fabric, combined and arranged with a vertical traverse movement.

3. The mode of obtaining a continuous weaving action in narrow fabric looms by the use of a secondary race for each shuttle.

ROBERT GRIFFITHS, of Great Ormond-street, Middlesex. *Improvements in propelling vessels.* Patent dated February 26, 1853. (No. 492.)

This invention has for its object the improvement of Mr. Griffiths' screw propeller, which was the subject of a former patent (see *ante* vol. 57, p. 261). As Mr. Griffiths' inventions are likely to come into very extensive use, it is rather surprising that he has displayed such carelessness in reference to the preparation of his claims. We publish them *literally*, in order to prove the propriety of this remark.

1st. "In the arrangement of pitching apparatus for altering the propelling angle contained within the propeller to be acted upon by a spanner or key applied from the vessel in combination with blades made narrower or taper towards their outside extremities."

2nd. "The constructing the blades of screw propellers separately from the boss or centre so that the same may be fixed or replaced at pleasure in combination with the taper blades and large centre boss as patented by me thirteenth of September one thousand eight hundred and forty-nine."

The first of these conveys nothing whatever, except a proof that the writer's geometrical instincts were very low indeed, or he would never have first implied that an angle could propel a ship, and then have made it appear doubtful whether the "propelling angle" was or was not contained within the propeller. It is strange that patentees should be thus regardless of their complete specifications, since they are the principal legal documents to which they can appeal in establishing their patent rights.

CHARLES TETLEY, of Bradford, York, gentleman. *Improvements in the manufacture of bobbins.* Patent dated February 26, 1853. (No. 494.)

The object of this invention is to obtain bobbins of different permanent colours, in order that each manufacturer, as well as the trade, may know his own bobbins, and it consists in causing the wood of which bobbins are formed to be dyed either before or after it is manufactured.

Admiral the Earl of DUNDONALD, of Belgrave-road, Middlesex. *Improvements in producing composition or combinations of bituminous, resinous, and gummy matters, and thereby obtaining products useful in the arts and manufactures.* Patent dated February 26, 1853. (No. 496.)

This invention consists in changing bituminous, resinous, and gummy substances from an indurated and brittle to a plastic, cohesive, flexible, or elastic state. As an example, resin is pounded and then mixed with viscid or unctuous oil of Pretroleum, or mineral tar, or other solvent, and then has added to it one-fourth of its weight of gum shellac, or other indurated gum, the mixture being stirred at the temperature of boiling water until the whole is thoroughly blended. If still further tenacity and flexibility are needed than are thus obtained, the viscid oil should be saturated with caoutchouc before it is added to the resin.

No claims.

JAMES MURPHY, of Newport, Monmouth, civil engineer. *Improvements in trucks, wagons, or vehicles for railway purposes.* Patent dated February 28, 1853. (No. 498.)

This invention consist; *firstly*, in making the upper portion or bodies of trucks or wagons used on railways to revolve round a central pin upon the framework, friction-plates or rollers being placed between the body and the framing; and, *secondly*, in drawing up, or tightening the connecting-chain between a pair of wagons loaded together by means of a rack attached to the coupling or drawing-hook, eye-bolt, or shackle, and placed in the interior of the wagon, and worked by a pinion, the axle of which is carried transversely to one or both sides of the wagon, terminating in a capstanhead, so that it may be turned by a lever.

MARTYN JOHN ROBERTS, of Woodbank, Gerard's Cross, Bucks, gentleman. *Improvements in the manufacture of mordants or dyeing materials, which are in part applicable to the manufacturing of a polishing powder.* Patent dated February 28, 1853. (No. 500.)

Claims.—1. The use of antimony in a metallic or other form, as a mordant, in dyeing cotton and other fabrics, and also for the purpose of brightening colours on such fabrics.

2. The use of the oxide of antimony as a polishing powder.

3. The manufacture of stannates, antimoniates, and antimoniites of soda used in dyeing, as described.

EDWARD HAMMOND BENTALL, of Heybridge, Essex, ironfounder. *Improvements in harrows.* Patent dated February 28, 1853. (No. 501.)

Claim.—The exclusive right to construct the framework of harrows principally of bars of wrought-iron, having flanges, ribs, or projections on their sides.

GEORGE DUNCAN, of Chelsea, Middlesex, engineer. *Improvements in steam boilers.* Patent dated February 28, 1853. (No. 502.)

Claims.—1. The mode of generating steam by means of tubular or cellular chambers revolving or moving over a heated medium.

2. The application and use of a tubular or cellular steam generator, or a plain boiler with or without flues, for generating steam by revolving or moving over a heating medium.

PETER ARMAND LE COMTE DE FONTAINEMOREAU. *Improvements in drying cigars.* Patent dated February 28, 1853. (No. 503.)

Claim.—The drying of cigars in an apparatus heated by water at a temperature of about 170° Fahrenheit.

SAMUEL CUNLIFFE LISTER, Manningham, near Bradford, York. *Heating and making cards.* Patent dated February 28, 1853. (No. 505.)

This invention relates; *firstly*, to a method of heating cards by fire-heat instead of by steam; and, *secondly*, to a mode of making the teeth for cards of flat wire, one edge of which is thinner than the other, in consequence of which they will resist greater strains when working fibrous material.

PROVISIONAL PROTECTIONS.

Dated August 10, 1853.

1857. George Parsons, of West Lambrook, So-

merset, engineer. Improvements in steam engines and boilers.

1859. John George Taylor, of Glasgow, Lanark, North Britain, merchant. Improvements in desks, work-boxes, dressing-cases, tea-caddies, and similar articles, and in the arrangements and fittings thereof.

1863. Samuel Hall, of 16, Chadwell-street, Pentonville, Middlesex. Improvements in furnaces.

1865. David Mushet, of Coleford, Gloucester, gentleman, and Edwin Whele, of Shiffnall, Salop, engineer. Improvements in propelling steam vessels or other vessels.

Dated August 11, 1853.

1867. Joseph Bacon Finnemore, of Easy-row, Birmingham, Warwick, manufacturer, and Edwin Daniel Chattaway, of Camden-street, Birmingham aforesaid, architect. Improvements in apparatus for ascertaining or registering the number of persons travelling by omnibuses or other vehicles, or who may have entered in or passed by out of or through any particular place, vehicles, or building during any given period.

1869. Thomas Kelley Hall, of Crewe, Chester, smith. Certain improvements in forge-hammers.

1870. Richard Farmer Brand, of South-terrace, Willow-walk, Bermondsey, Surrey, gun-maker. Certain improvements in fire-arms and ordnance.

1871. Henry Palfrey Stephenson, of Thurloe-place, West Brompton, Middlesex, civil engineer. Improvements in the construction of suspension-bridges.

1873. John Dearman Dunnicliff, of Hyson-green, Nottingham, lace-manufacturer, and John Woodhouse Bagley, of Radford, Nottingham, lace-manufacturer. Improvements in the manufacture of lace fabrics.

1875. Thomas Frederick Newell, of Cloak-lane, Queen-street, Cheapside. Improvements in machinery for numbering the pages of books and documents. A communication.

1877. Hugh Lee Pattinson, of Scots' House, near West Boldon, Gateshead. Improvements in the recovery of sulphur from alkali waste.

Dated August 12, 1853.

1878. Samuel Adams, of West Bromwich, Stafford, manufacturer. A new or improved apparatus for regulating the supply of water to steam and other boilers, applicable also to regulating the supply of liquids to vessels and reservoirs in general.

1879. Louis Van Caneghem, of No. 6, Conduit-street, Regent-street, Middlesex, and of No. 138, Faubourg St. Denis, Paris, steel-busk manufacturer. Improvements in fastening corsets by a mechanical busk.

1880. James Strong, of Smethwick, Stafford, engineer. Improvements in furnaces for smelting ironstones and ores.

1881. Thomas Turner and John Field Swinburn, both of Birmingham, Warwick, gun-manufacturers. Improvements in sights for rifles.

1882. Edward Lavender and Robert Lavender, both of Deptford, Kent, general traders. An improved apparatus for preparing the materials employed in the manufacture of certain composition fire-lighters.

1883. Read Holliday, of Huddersfield, York. Improvements in lamps, and in lanterns used therewith.

1884. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agents. Improvements in the manufacture of fuel. A communication.

1885. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agents. Certain new compounds which may be employed for mouldings, frames, and many purposes to which wood, papier-maché, plaster, gutta percha, and other like substances are applicable. A communication.

1886. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agents. A method of obtaining impressions from dies and other engraved and figured surfaces by stamping or pressure. A communication.

1887. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agents. A method of producing castings in malleable iron. A communication.

1890. William Littell Tizard, of Aldgate, London, brewers' engineer. Improvements in the construction of thermometers and other like indicators.

1891. William Aldred, of Manchester, bleacher, Richard Fenton, of Prestwich, waste dealer, and William Crone, of Salford, fent dealer, all of Lancaster. Certain improvements in separating or recovering the wool from cotton and woollen or other similar mixed fabrics, whereby the wool is rendered capable of being again employed.

1893. Horatio Wareham, of Fenton, Stafford, potter. Certain improvements in inlaying or ornamenting earthenware vessels.

1894. Robert Smith Bartleet, of Redditch, Worcester. Improvements in apparatus used in sewing.

Dated August 13, 1853.

1895. Frederick Lipscombe, of 233, Strand, Middlesex, water-filter manufacturer. Improvements in evaporating.

1896. John Clegg Boond, of Manchester, warehouseman. Certain improvements in Jacquard apparatus.

1898. George Peel, of Manchester, engineer, and Robert Brownhill, of the same place, manager. Improvements in air-pump buckets, and in valves for steam engines and other purposes.

1899. Chandos Wren Hoskyns, of Wroxhall, Warwick, Esq. Improvements in the application of steam to cultivation.

1901. John Gwynne, of Essex-wharf, Essex-street, Strand, Middlesex, gentleman, and James Egleson Anderson Gwynne, of the same place, engineer. Improvements in the preparation or manufacture of fuel.

1902. John Gwynne, of Essex-wharf, Essex-street, Strand, Middlesex, gentleman, and James Egleson Anderson Gwynne, of the same place, engineer. Improvements in the preparation of beet-root for the manufacture of sugar, which improvements are also applicable to the preparation of other vegetables.

1903. John Henry Johnson, of 47, Lincoln's-inn-fields, Middlesex. Improvements in dyeing or colouring textile fabrics and materials, and in the machinery or apparatus connected therewith. A communication from Emile Weber, of Mulhouse, France, chemist.

1904. John Henry Johnson, of 47, Lincoln's-inn-fields, Middlesex. Improvements in the manufacture or treatment of gutta percha, and in the application thereof. A communication from Louis François Alexandre Deseille, of Paris, France.

1905. Edward John Scott, of Glasgow, Lanark, North Britain, shoe-manufacturer. Improvements in the manufacture of boots and shoes.

1906. Hesketh Hughes, of the firm of Hughes and Denham, of Cottage place, Middlesex, engineer. An improved method of producing cut and fancy patterns in velvets, silks, and other textile fabrics.

Dated August 15, 1853.

1908. Alexander Dalgety, of No. 76, Florence-road, Deptford, Kent. Improvements in rotatory steam engines.

1909. George Edward Dering, of Lockleys, Herts. Improvements in electric telegraphs.

1910. Archibald Douglass, of Norwich, silk-ma-

nufacturer. Improved machinery for stitching, backstitching, and running.

1911. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agents. A method of and machinery for reducing wood and other vegetable fibres to pulp, applicable to the manufacture of paper, pasteboard, millboard, papier maché, mouldings and other like purposes. A communication.

Dated August 16, 1853.

1913. Benjamin Rankin, of 1, College-street, Islington, Middlesex, gentleman. Improvements in propelling vessels.

1915. Joseph Martin, of Liverpool, Lancaster, merchant. Improvements in mills for grinding corn and other grain.

1917. Peter Foxcroft, of Salford, Lancaster, manager. Certain improvements in machinery or apparatus for doubling cotton and other fibrous materials.

1919. William Hunt, of Lee Brook Chemical-works, near Wednesbury, Stafford, manufacturing chemist. Certain improvements in manufacturing sulphuric acid.

PATENT APPLIED FOR WITH COMPLETE SPECIFICATION.

1945. John Webster Cochran, of No. 17, Gower-street, London, Middlesex. Improvements in machinery for crushing, grinding, and pulverizing stone, quartz, and other substances. August 20.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," August* 26*th*, 1853.)

769. Lot Faulkner. Certain improvements in the method of obtaining motive power.

772. Robert McGavin. Improvements in the construction of ships' masts, yards, booms, and in spars.

922. Samuel Bayliss. Improvements in consuming or preventing smoke and heating liquids.

(*From the "London Gazette," August* 30*th*, 1853.)

794. James Findlow. Improvements in beds or couches for sick persons.

797. William Beckett Johnson. Improvements in steam engines, and in apparatus connected therewith.

806. Antoine Burq. Certain instruments, apparatus, and articles for the application of electro-galvanic and magnetic action for medical purposes.

854. Stephen Taylor. Improved machinery for weaving seamless goods. A communication.

865. William Russell Palmer. Improvements in the construction and arrangement of machines for the application of horse power, which he designates as "Palmer's improved horse power."

866. William Russell Palmer. Improvements in machines for threshing seeds and grains, and for cleaning them from the straw and chaff after they are threshed, which he designates as "Palmer's American seed and grain-thresher and winnower."

901. John Chadwick and Thomas Dickins. Improvements in the production of raw and thrown silk.

914. François Marie Antoine Serruys. Improvements in tanning. A communication from Herman de Bock, of Bruges, in Belgium.

924. Jean Marie Souchon. Improvements in the manufacture and purification of gas for illumination, and certain products therefrom, and in apparatus for that purpose.

931. Richard Ford Sturges. A new or improved apparatus for making vegetable and other infusions and solutions.

938. François George Sicardo. A new rotary steam engine.

1165. John Fisher. Improvements in machinery for propelling vessels, and in the mode of manufacturing the same.

1114. Gregory Kane. The construction of portable houses, or portions thereof, out of parts which may be used for other purposes.

1159. Henry Potter Burt. Improvements in portable houses.

1345. Maxwell Scott. Improvements in propelling.

1427. William Henry Smith. Improvements in the permanent way of railways.

1759. Farnham Maxwell Lyte. Improvements in obtaining iodide of potassium when treating certain metals.

1824. Richard Brown Roden. Improvements in rolling iron and all other malleable metals and alloys.

1837. Martin Zadick Just. Improvements in machinery for hulling and dressing paddy or rice. A communication.

1838. John Hughes. Improvements in building or forming structures under water, or below the surface of the ground.

1857. George Parsons. Improvements in steam engines and boilers.

1873. John Dearman Dunnicliff and John Woodhouse Bagley. Improvements in the manufacture of lace fabrics.

1883. Read Holliday. Improvements in lamps, and in lanterns used therewith.

1884. Richard Archibald Brooman. Improvements in the manufacture of fuel. A communication.

1885. Richard Archibald Brooman. Certain new compounds which may be employed for mouldings, frames, and many purposes to which wood, papier maché, plaster, gutta percha, and other like substances are applicable. A communication.

1886. Richard Archibald Brooman. A method of obtaining impressions from dies and other engraved and figured surfaces by stamping or pressure. A communication.

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1898. George Peel and Robert Brownhill. Improvements in air-pump buckets, and in valves for steam engines and other purposes.

1901. John Gwynne and James Egleson Anderson Gwynne. Improvements in the preparation or manufacture of fuel.

1908. Alexander Dalgety. Improvements in rotatory steam engines.

1913. Benjamin Rankin. Improvements in propelling vessels.

WEEKLY LIST OF PATENTS.

Sealed August 27, 1853.

498. James Murphy.

502. George Duncan.

503. Peter Armand Lecomte de Fontainemoreau.

526. Marcel Vetillart.

545. Robert Craig Ross.
547. Joseph Sparkes Hall.
591. John James Alexander Maccarthy.
624. Auguste Edouard Loradoux Bellford.
761. James Roscoe and Robert Bullough.
803. Francis Steigewald.
805. Francis Steigewald.
846. William Moseley.
1155. Jacob Brett.
1273. John Henry Johnson.
1308. Alexander Keiller.
1451. Jules Dehau.
1452. Jules Dehau.
1456. John Elliott and John Brown.
1472. Joseph Warren.
1482. William Hall.
1509. Richard Cornelius.
1523. Francis Huckvale.
1524. William Geeves.
1545. Henry Goodall.
1549. John Emanuel Lightfoot.
1563. John Henry Johnson.
1567. John Paterson.
1602. Nathan Pollard.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
Aug. 26	3503	S. Van	Kilburn Priory	Pin-case.
30	3504	W. and W. Field	Redditch	Needle-casket.
31	3505	Cox and Wilson	Oldham	Steam-engine cylinder.

NOTICES TO CORRESPONDENTS.

T. R. N., Birmingham.—A design protected by a provisional registration that is to be the subject of a complete registration, must be *in no* way changed after the first protection, either in the configuration or *arrangement* of its parts.

A Subscriber, Dublin.—We will endeavour to afford space for a full reply to your question in our next Number.

A Correspondent, G. B., Hoxton, requests permission to point out what he considers "a slight mistake" of our correspondent on "Aërial Travelling." The sentence to which he takes exception is one near the end of "N. B.'s" letter, commencing "Experiment has shown." "This sentence," G. B. says, "should be written:—Experiment will prove what common sense might long ago have dictated, that *there is a very great analogy* between *propulsion in* the air and *in* the water. The problem how to steer a balloon may be classed with modern attainments, instead of with ancient impossibilities." We do not think it right to place this correction under the heading "Errata," unless requested to do so by "N. B." Perhaps many may consider that the alteration would introduce an error at the expense of a truth; an opinion which would coincide with our own.

Errata.—In our last Number, the following corrections are required:—In the article on Mr. Preller's leather, page 164, 1st column, for the third line from the top, read "from 8d. to 1s., these fetch 2s. 6d." Same column, nineteenth line from top, for "goat's," read "calf's." In the letter of "N. B.," page 167, 1st column, line 20 from bottom, for "directly," read "inversely."

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1570.] SATURDAY, SEPTEMBER 10, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

KRUPP'S PATENT WHEEL-TYRES.

Fig. 2. Fig. 3.

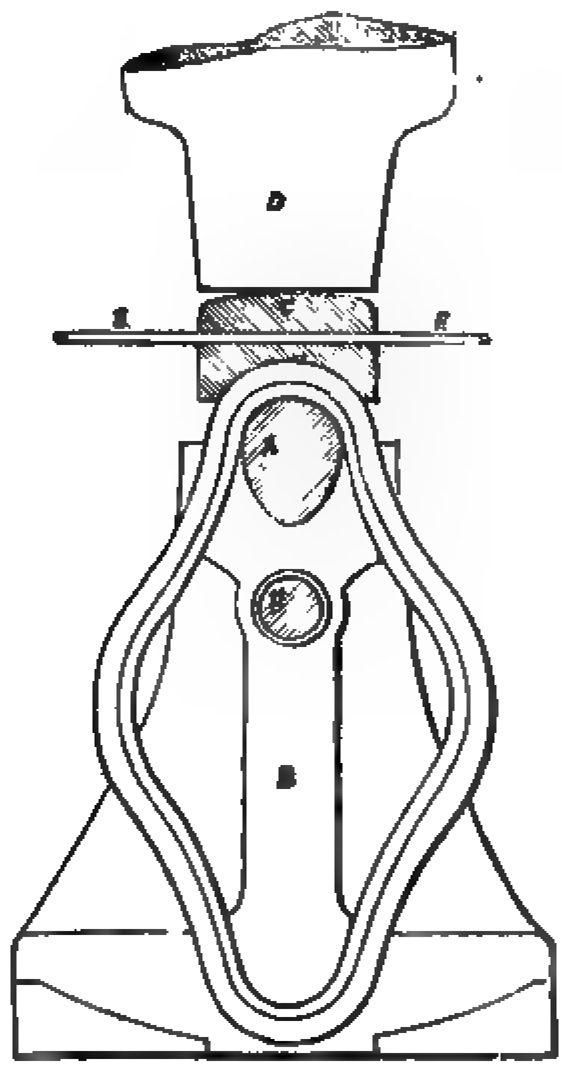


Fig. 1.

KRUPP'S PATENT WHEEL-TYRES

(Patent dated June 18. Specification enrolled December 17, 1852.)

THERE are but few parts of railway machinery that have received more attention, or have been more varied, than railway wheels; but hitherto, whatever their construction, they have been subject to the flying off of their tyres, on account of some imperfection in the weld or joint.

However perfect this may be when it leaves the shop, there is no dependence upon how long it may remain so. Under the most favourable circumstances of material and workmanship, there can be no guarantee against the occurrence of accidents as long as the tyres are constructed according to the methods now in use. The fact would seem to be established that the fault lies in the principle of construction, and that the principle itself must be corrected before we can reckon upon immunity from this source of danger. Mr. Krupp appears to us to have formed an exact appreciation of this circumstance, and we are quite confident that the application of his mode of construction will prove perfectly successful in practice. He takes a solid bar of cast steel, opens it out, expands it, and forms his tyre without any joint or weld whatever. Two processes are described in the specification, one of which is called by the patentee the "hammering process," and the other the "rolling process." We now propose to describe generally the character of the "hammering process," and the principal means employed in it.

As it is requisite, in order to manufacture a good and perfect tyre, that the cast steel should be sound and free from blemish, it is advisable to remove the head or top-part of the ingot, or so much of it as may be hollow or porous, from the casting. For ordinary tyres for railway wheels, the patentee casts the ingot of steel from eight to ten inches square, and of sufficient length to form a tyre. Care must be observed to insure to the finished tyre that degree of compactness and toughness obtained in forging or rolling cast steel for other purposes, and well understood by manufacturers of cast steel.

The ingot having first been cast into a bar with circular ends, fig. 1 represents the anvil employed for giving a preparatory shape to the bar. A is the anvil, supported upon a heavy block of metal B, and is free to slide to and fro in the groove *a a*, to allow every part of the bar to be brought under the head of the hammer. The flanges on the tyre are formed by the upper portion of the metal being driven down by the successive blows of the hammer, until it fills up the hollow recesses *b b* in the anvil, there being sufficient metal in the depth of the bar for that purpose. This hammering will reduce the depth of the bar to about 5¼ inches, which is about the breadth of the tyre when finished. The size of the flange will depend upon the depth of the hollow recesses *b b*, which may be made of any size and shape to suit the different kinds of tyres required. After the bar has been thus partially formed, each of the two circular heads or ends formed upon it is perforated with a hole of about two inches in diameter, or the holes may be punched through them while the bar is in a heated state. The bar is then cut or split through the centre longitudinally between the holes, by means of an ordinary slotting-machine, circular saws, or any other suitable means. The bar is then in a fit state to be opened out into the circular shape necessary to form the tyre. The circular ends are first expanded to the extent of about six or eight inches by means of circular wedges driven in by hammers or by pressure, while the bar is in a heated state. The corners left in the circular holes must next be shaped off to a curve corresponding to the outer curve of the bar, so that, when the bar is opened out, its inner surface shall be uniform and smooth. The bar is next heated, and wedges or keys are driven into the slot, for the purpose of widening it. It is then ready to be transferred to the drawing-machine. In the operation of drawing it may be necessary to transfer the bar from time to time to another kind of anvil, represented in figs. 2 and 3, for the purpose of tightening and compressing the metal, and keeping its surface smooth. After the sides of the bar have been expanded as far as may be requisite, the bar is removed to the anvil before referred to, which is constructed in the following

manner. A is the anvil, supported by its two ends in strong pillars or frames B B. The opening between these pillars or frames B is to allow of the partially-formed tyre being placed upon the anvil. B' is a strong tie-bolt, which passes through both the frames B B, for the purpose of rendering them more firm, and for preventing them from shaking. This bolt must be removed each time the tyre is put upon or taken off from the anvil. C is a tool, the under face of which is cut to correspond to the face of the tyre, and prevent it from being injured by the successive blows of the hammer D. E E are rods attached to the tool C, for the purpose of guiding it, and to enable the workman to hold it in its place. The object of this hammering is to equalize the thickness of all parts of the tyre, and also impart to it a circular shape. After the tyre has been completed thus far, it is laid in a horizontal position upon the anvil, and again hammered. The edges of the tyre are here rendered more perfect, all inequalities being reduced by the hammer. In order to ensure the tyre being perfectly circular, before turning and facing it in a lathe, it is subjected to the operation of a machine used for a similar purpose in making wrought-iron wheels in the ordinary manner.

After the tyre has undergone this last operation, it is placed in a face-lathe adapted for that purpose, and turned; when it is prepared for being fixed upon the body of the wheel by any of the methods usually adopted.

STEAM FIRE-ENGINE.

(From the *Journal of the Franklin Institute.*)

The following description of the Cincinnati steam fire-engine has been communicated for the *Journal* by T. W. Bakewell, Esq., who obtained it from Mr. A. B. Latta, the builder. We believe no previous authentic account has been published of this machine, which has excited considerable notice, and is probably destined to play an important part in the protection of buildings from fire.

This machine has been in operation since the 1st of January, 1853, and has proven itself successful beyond all doubt, although the project has been tried before, and set down as impracticable, because it requires a machine that can be brought into operation as soon as hand apparatus. This, with other objections,—such as running over rough streets, laying on uneven ground when at work, running up and down hill, and a host of other objections,—have been causes for abandoning the use of steam heretofore; but these objections have been completely set aside by the operation of this machine. The first thing of importance in this engine is the principle of generating steam, which is a very old principle, but has not been properly understood heretofore. It is the same that is now being projected by a Frenchman, which he calls a serpentine boiler, which is a continuous pipe coiled spirally or otherwise, so as to let the fire have a chance to surround it; the water being injected, it is instantly converted into steam; this accounts for the short time it requires to raise steam. This machine resembles a locomotive in some respects; it has cylinders on both sides, placed like those of a locomotive, the pumps being directly forward of the steam cylinders; the piston-rods run directly out of the steam cylinders, and enter the pumps; the engines are so arranged as to couple to the driver at pleasure; this is done in order to drive the machine by steam when desired, and to hold back when going down-hill, or assist in going up; this is an important consideration; the drivers resemble those of a six-wheel locomotive, being aft of the fire-box; the forward end of this machine runs on one wheel and revolves round like that of the velocipede, by which means the machine can be turned anywhere in the length of itself. Another reason why it should only have three wheels is, that its bearings are like those of a three-legged stool; it always comes to a bearing, without straining or twisting the machine; the perfect adaptedness of this combination to suit the circumstances, is the cause of its success. This machine is constructed of iron and brass, except the wheels, which are partly of wood. I believe the worst throwing it has ever made was when it was brought out to throw before the Hope Hose Company of Philadelphia; I believe it only threw 160 feet; the greatest throw it has ever made is 240 feet from the end of the nozzle to where the solid body of water fell, through a 1¾-inch nozzle; and 291 feet to where the spray fell. This machine will discharge about 2,000 barrels of water in one hour. It throws from one to six streams of water, and has two suctions 6½ inches in diameter, and 24 feet long; each one is in one piece; these are always at-

tached to the engine; they cross each other in front, and lay back on either side; this is a very important improvement, and a saving of time and labour in attaching the suctions. The time required to put this machine in operation is five minutes; it requires four men and four horses to operate it, and will do as much as six of the largest class hand-apparatus. This will give the reader an opportunity of estimating the economy in the use of steam for this purpose. Any further information can be obtained concerning it, by addressing A. B. Latta, who is the projector and builder of this machine, at Cincinnati.

Now, by way of illustration, we may notice its performance at one fire, to show the effect produced by this machine, compared with that by the hand-apparatus. A fire occurred on the 20th of May, 1853, on Twelfth and Main-streets, at three o'clock P.M.; the alarm was given, the steam-engine ran eight squares, laid her hose, which was one square from the fire, and put the first water on the fire, which was all done in about five minutes; the hand-apparatus, notwithstanding there were some of them stationed only two squares from the fire, were not at work until the steam-engine was under way. In eight and a half hours' work (making due allowance for waste of water), she poured into the fire about 15,000 barrels of water; it was a large brewery, with sale-cellar; the wind was high, and nothing but a cataract of water could have saved the entire square from destruction. This will show what can be done with steam in putting out fires. Arrangements are now making for four more of these machines by the chief engineer of the fire department. This will give the fire department of Cincinnati the greatest strength of any in the Union.

ARMITAGE'S LIGHTNING-ROD.

The Committee on Science and the Arts, constituted by the Franklin Institute, for the promotion of the Mechanic Arts, have made the following report upon this lightning-rod, of the merits of which such very high opinions were entertained by some.

The lightning-rod of Mr. Armitage differs from that ordinarily in use, by the substitution of a pointed magnet for the purpose of discharging the electricity from the clouds, in the use of a number of points for a peculiar purpose, and in so adjusting the magnet with its appendages that it may always be directed towards the point from which the storm is proceeding. Its construction is as follows:

The usual metal rod is extended from the ground to the top of the building to be protected, where it terminates in a number of iron points, which are painted for the purpose of preventing rusting. A few feet below this termination, a cross piece of iron works freely by means of a collar upon the upright rod, and carries at one end the magnet surrounded by points, while at its other extremity it bears ornamental figures of sheet iron, exposing sufficient surface to cause it to operate as a weather-cock, thus keeping the magnet always turned to the quarter from which the wind is blowing.

The steel, before being magnetized, is made to undergo a tedious process, the nature of which was not fully explained to the Committee, with the object of preventing it from rusting; it is then magnetized by subjecting it to a galvanic current. In the specimens submitted to the Committee, the magnetism communicated was very feeble, so much so as to lead Mr. Armitage to the belief that it was of a peculiar nature, having an attraction for iron, but not for steel, and presenting but one pole, and that of a different nature from either of those of ordinary magnets. The Committee, of course, demonstrated to him the errors in these views.

The supposition that this lightning-rod is more efficient than the ordinary one, rests on the belief that a magnet exerts a greater attraction for electricity than a piece of platina, or other metal. As Mr. Armitage stated that experiments made by himself, in conjunction with another gentleman, had shown this to be the fact, the Committee felt of course bound to endeavour to confirm or confute this opinion by direct observation; and a course of experiments was in consequence instituted, in which the distance was determined at which the spark from the prime-conductor of an electrical machine could be taken by the same piece of iron, at one time unmagnetized, and at another highly magnetized by the influence of the galvanic coil. This distance was found to be the same. The distance at which a point would prevent the accumulation of electricity in the conductor (as indicated by a quadrant electrometer placed upon it) was then tried and found to be the same, whether the point was magnetic or not. They therefore believe that the opinion of Mr. Armitage, that a magnetic point will give greater security from the effects of lightning than an ordinary one is fallacious.

Mr. Armitage has surrounded his magnet with a brush of iron points, and terminated the vertical point of his rod with a similar brush, believing that through them the electricity which enters by the magnet will be

again dissipated. It is scarcely necessary for the Committee to advert to the error of this belief. The brush, which is undoubtedly the most effective termination of a lightning-rod, loses in his rod very much of its efficiency by being thickly covered with a coating of paint, to preserve the points from rusting.

The idea of presenting the points always towards the storm is in itself excellent, but it is accomplished in this rod only by breaking the perfect metallic connection which ought to exist between all its parts; which break might perhaps lead to accident, and must undoubtedly diminish the inductive efficiency of the point, when by the accumulation of rust at the collar, a bad conductor of electricity is interposed between the magnet and the ground. The same advantage is fully gained by terminating the ordinary lightning-rod by a ring or brush of points of platina wire, pointing in all directions.

In conclusion, therefore, the Committee cannot approve of the method of constructing lightning-rods proposed by Mr. Armitage:

First. Because they do not believe that the magnet is in the least more efficient in discharging the electricity of the thundercloud than an ordinary metallic point.

Second. The efficiency of the point is reduced by the want of perfect metallic connection between it and the ground.

For these reasons, the Committee believe that the lightning-rods thus constructed are decidedly inferior to those commonly used.

NEW APPLICATION OF PHOTOGRAPHY — DAGUERREOTYPES ON WOOD.

Mr. R. Langton, wood-engraver and Draughtsman, of Manchester, has produced some very successful and beautiful specimens of photography, taken by himself, on blocks of box-wood. This photograph, so taken, is quite ready for the application of the wood-engraver's burin. It is impossible to say how greatly this will advance the process of wood-engraving, especially by saving all the preliminary labour of the draughtsman; which, in many cases, constitutes the chief element in both the time and the cost attendant on the production of wood-engravings of a high class. Even in many of the lower branches of the art, the new application of sun-drawing will be an invaluable auxiliary. For instance, it is an exceedingly difficult matter to get accurate drawings of machinery, in perspective; mechanical draughtsmen only represent it in plane; and artists are generally found extremely reluctant to employ a large amount of time so unprofitably as the drawing of a complicated machine in perspective demands. These photographs can now, in a few seconds, accomplish what it would require hours for the artist to effect; and in point of accuracy the instrument must ever have the preference. But great as will eventually be the boon which this new application of photography will confer on the practical art of wood-engraving, it may be made more extensively valuable as a cheap form of producing pictorial objects. By Mr. Langton's process, portraits, landscapes, &c., could be produced on any smooth piece of wood, duly prepared; and thus even wooden snuff-boxes, hand-screens, &c., may be decorated with portraits, or scenes from nature, or copies of works of art, at a cost much less than daguerrotypes on metal plates. Indeed, it is difficult to say where the applications and uses of this new process may not extend. The inventor does not limit his invention to its use in wood-engraving, but claims for it an equally useful and valuable application in other directions, in connection with practical art. —*Civil Engineer and Architects' Journal.*

AERIAL NAVIGATION.

To the Editor of the Mechanics' Magazine.

Sir,—On perusing N. B.'s review of Mr. Nye's pamphlet on Aërial Travelling, at p. 167, I was greatly astonished to find the reviewer winding up with such a sentence as the following: "Experiment has shown what common sense might long ago have dictated, that there is no analogy between sailing in the air and in the water: the problem, how to steer a balloon, is now classed by practical as well as scientific men with those ancient disturbers of the public peace, the discovery of perpetual motion, and the *elixir vitæ*."

Like your correspondent G. B., Hoxton (p. 200), I thought there must be some (not *slight*, but serious) mistake in the typography. If, however, the sentence is genuine, I would refer the writer to a communication on this subject at p. 39 of your twenty-sixth volume, in which experiments and common sense certainly take a different view of the question.

"Sailing *in* the air, and sailing *in* the water," whatever N. B. may say to the contrary, must be analogous; differing only as to the relative density of the media sailed in. Sailing *in* the air, and sailing *on* the water, present a different feature; the wind, in the latter case, being the propelling

medium, and the water—a fluid of much greater density—being the resisting and guiding medium.

Propulsion in air, or upon water, by means of propelling and guiding apparatus acting upon the fluid travelled through, are, as I have before stated, perfectly analogous, and the principles enunciated in your twenty-sixth volume, before alluded to, I hold to be incontrovertible.

Those persons who, like N. B., class the problem of aërial navigation with the discovery of *perpetual motion* and the *elixir vitæ*, are manifestly incapable of distinguishing between the possible and impossible. The discovery of fixed and unalterable laws has clearly shown the fallacy of the latter; whereas experiment and common sense, as far as they have been carried, demonstrate the practicability of the former. That no practical application has yet been made of this knowledge is no proof of the reverse. Practical experiments with balloons of suitable power and capacity are very costly matters, requiring such a combination of money, time, and talent, as do not often fall to the lot of practical men.

A Committee, for the employment of balloons for scientific purposes, met some time since at Kew; let them extend the field of their labours by receiving (in confidence) and investigating the schemes of those persons who profess to be in possession of plans for propelling and guiding balloons. Should any of the plans submitted appear sufficiently plausible, then let it be made matter of experiment upon a scale adequate to a chance of succeeding.

If this is done, depend upon it the character of ballooning in this country will be rapidly and wonderfully changed for the better, and probably take its place among the *useful* discoveries of the present century.

I remain, Sir, yours respectfully,

William Baddeley.

13, Angell-terrace, Islington, Sept. 5, 1853.

BERDAN'S CRUSHING AND AMALGAMATING MACHINE.

Our attention has lately been directed to a model of this machine. The inventor had received the congratulations of the American press, and the favourable testimony of many who are working his invention with great advantage in the United States, before he introduced it to this country. The model shown to us was very imperfect, being deficient of several important features of the invention. The following description, aided by the accompanying engraving, will however furnish sufficient information as to the structure and mode of operation of the machine.

It consists of large iron basins, fixed on inclined axes around which they are capable of rotary motion. In these are placed solid spheres of iron, which, of course, lie in the lower parts of the basins when the machine is at rest. Each sphere is attached at one point of its surface to a rotating pivot, which has the same inclination as the axis of the basin to which it is connected. The amalgamation, as well as the crushing, is performed in the basins; and in order to facilitate the combination of the gold and mercury, a furnace is placed under each basin, by means of which furnace the mercury is heated, and its affinity for the metal increased.

When the basins commence to rotate, the friction between them and the spheres carry, or tend to carry, the latter up from the position they assume when at rest; gravity at the same time holding, or tending to hold them in the last-mentioned position. In addition to the forces of friction and gravity a third force is made to act upon the spheres resulting from the action of the pivot before referred to. From the combined action of these three forces a complex action takes place between the spheres and the basins, which is highly favourable to the reduction of quartz and

other such substances. From the inclination of the basin the mercury is held by gravity at the crushing point of the ball, and seizes upon the metal as soon as it is detached from the quartz. The *Mining Journal*, in an article upon this machine, makes the following important observation: —"It is well known by all experienced practitioners that perfect amalgamation cannot be effected without rapid trituration under considerable pressure; and the difficulties with all other machines now in use, in which it is attempted to pulverize and amalgamate by one and the same operation, is that the machines are so constructed that they do not keep the mercury at the crushing point of the ball or wheel, or prevent the circular motion of the water and hastily-pulverised ore, unless the ore is ground in the form of a paste or pulp. In such a case the mercury becomes badly broken up, and large quantities pass off with the refuse or tailings."

Mr. Berdan is reported to have sold his American patent for £110,000. One of his machines arrived in this country on Saturday last.

HALL'S MACHINES FOR CUTTING OUT BOOTS AND SHOES.

Mr. Hall, to whom the public generally, and ladies especially are indebted for the "elastic side insertion," by which the buttons and strings of boots and shoes are altogether dispensed with and the comfort of the wearer is increased, has lately effected an arrangement of machinery for cutting out the parts of boots and shoes in such manner as to produce a great saving in both time and materials. This invention appears very opportunely, as the price of leather is at the present time enormous. From a piece of leather of the ordinary size of one golosh "vamp," he produces three pieces suitable for the golosh or toe-cap of an ordinary half-boot. This is effected by suitably arranging the patterns, three different forms and sizes being sometimes combined in one cutter.

ON THE MANUFACTURE OF CAST STEEL. BY DR. KARSTEN.

In the processes employed for decarbonizing pig-iron and converting it into steel, it has not hitherto been possible to obtain a product of perfectly homogeneous nature. It is always necessary to sort the steel, in order to separate the harder parts containing more carbon from the softer, and these again from the steel-like iron. This absence of homogeneity in the product, resulting from the imperfection of the processes, led to an attempt to give the steel great uniformity of texture by melting. The so-called cast-steel is really a much more homogeneous and trustworthy product than the raw steel, or that obtained by cementation, although its characters likewise depend upon the proper and careful selection of the material from which it is made. In consequence of the fact, that steel may be prepared by fusion, which, together with a large per centage of carbon and consequent hardness, possesses homogeneity whatever may be the degree of hardness desired, cast-steel has acquired such a well-merited reputation, that it is now always employed for articles in which great hardness is indispensable. However perfect the process for making cast-steel may appear to be, it is still open to the disadvantage, that the selection of the suitable material must be entrusted to the judgment of the workman, and consequently that however homogeneous the product, the per centage of carbon, the hardness and solidity of the steel cannot be determined with precision beforehand. Such imperfections in the practice of metallurgical operations are in every case unavoidable, when determinations of weight must be replaced by the practised eye of the workman. The per centage of carbon in the material employed in making cast-steel —cementation-steel—is different in every part of the section of the bars, so that the average per centage of carbon in the charge of a crucible and the product of the casting cannot be determined with precision. Although the hardness of the English and good German cast-steel correspond tolerably well with that which is required, this result is solely attributable to the perfect acquaintance of the workmen with their materials, and their careful selection of it for this practical purpose. There would be no uncertainty as to the result, if we possessed a material applicable to the preparation of cast-steel, in which the per centage of carbon could be calculated. The white pig-iron made from pure spathic and brown iron-ores free from disseminated copper pyrites, and the per-centage of carbon in which may, without any considerable error, be assumed as 5·6, is a material of this description. The per centage of carbon in the best kinds of Swedish bar-iron, and the iron which is made in Germany from the pure spathic and brown iron ores, may very safely be assumed as 0·25 on the average. The above pig-iron and this bar-iron are the purest kinds known, containing only traces of silicon, from which likewise the cementation steel used for making cast-steel is never free. Both these kinds of iron are, therefore, of such a nature as to enable the operator to determine beforehand with precision the per centage of carbon in

a crucible-charge, and to produce cast-steel of any desired degree of hardness by means of a simple calculation of the requisite proportion of the two kinds of raw material. If the per centage of carbon in the melted product obtained in this way, and the characters dependent upon that per centage, should be found to agree perfectly with calculation—a question to be determined only by experiments on a large scale—it might be expected that the production of cast-steel from these materials would constitute a new phase of this branch of industry in Germany; for besides the trustworthiness of the operation, by which cast-steel could be made of any desired degree of hardness and tenacity, it possesses economical advantages in the cheapness of the raw material.

But the production of cast-steel by melting together white-iron and pure bar-iron appeared to be liable to an objection far greater than that founded upon the impurity of the raw material, and this arose from the doubt as to whether the product of the fusion would be homogeneous. However, the question of practicability could only be decided by direct experiment. Such experiments were made in the years 1846 and 1847.

The melting-crucibles employed were of such capacity, that from 30 to 35 lbs. could be melted at a time. The melted metal was as usual run off into cast-iron moulds. The following is a brief statement of the results obtained in a great number of meltings, and the subsequent treatment of the cast-steel:

1. In the selection of the pig-iron, it is of great importance to employ such as presents perfect lamellar structure, and not such as is partly fibrous or compact. The use of lamellar-iron is necessary, and not only in order that the per centage of carbon in the charge may be calculated with accuracy, which cannot be done with fibrous or compact-iron, in which the per centage of carbon varies greatly, but likewise and especially because the lamellar-iron exercises the greatest solvent action upon the bar-iron, so that even a comparatively much larger quantity of these kinds is but an imperfect substitute for the lamellar-iron. Consequently, good cast-steel cannot be produced in this way without lamellar pig-iron.

2. The extremely high temperature which bar-iron requires for fusion appeared to render it necessary that it should be added to the charge in small fragments. On this account the first fusions were made with bar-iron, which had been rolled into moderately thick sheets, and then cut into pieces. However, it was subsequently ascertained, that the solution of the bar-iron in the liquid pig-iron takes place without any difficulty, and that the product is equally good when thick pieces are used, so that finally masses of a cubic inch in dimension were employed. By this means the expense of cutting the bar-iron is obviated; at the same time the iron is less oxidised, and less room is taken up in the crucible than when it is in small fragments.

3. In order to produce a homogeneous cast-steel, the highest possible temperature is necessary for the fusion. Consequently very infusible crucibles, which are not liable to crack, are a much greater desideratum in the production of cast-steel from pig and bar-iron, than even in the melting of steel itself. Of course the greater the number of meltings which can be made in one crucible, the greater is the economical advantage gained.

4. The melted metal must be run off into the cast-iron moulds as rapidly as possible, in order that the whole mass may cool uniformly. At the same time care must be taken that none of the slag is allowed to pass from the crucible into the moulds, for there is not time for the slag to separate from the metal; it solidifies in the midst of the steel, and renders the casting defective, and causes the bar to rend in rolling. This may be most advantageously obviated by taking the cover from the crucible while it is still in the furnace, and skimming off the slag with a ladle-shaped iron. The small quantity which then remains may easily be kept back in the ordinary way during the casting.

5. The cast-steel, when allowed to cool slowly in the crucible, loses all coherence, and breaks down under the hammer or rollers. The cause of this appears to lie in the formation of carburets of iron, which do not remain combined with the rest of the steel containing less carbon.

6. The cast bars must, after they have cooled, be freed from all adhering granules of metal by means of a chisel. If this is neglected, the edges of the bars become broken in rolling.

7. In heating the cleaned bars for the purpose of further working, a bright red heat must be employed. This cannot be effected in a satisfactory manner before a blast, because the temperature is not sufficiently uniform, and a uniform heat is indispensably necessary for the favourable result of the rolling or hammering. This can only be effected in a well-constructed reverberatory furnace, and most advantageously in one fed with gas, a slight excess of which is present.

8. It is preferable to roll the heated bars rather than to hammer them; but if a hammer is used it must be of considerable weight.

9. The cast bars presented a perfectly homogeneous appearance, even after rolling.

The bars were first rolled out square to a length of 4 feet, and then, after reheating, brought into the desired form. They admitted of being rolled into the thinnest sheets without cracking at the edges.

10. Even in making soft steel, for which purpose the crucible was charged with 25 lbs. of bar-iron, and 2 lbs. of pig-iron, a perfect solution of the bar-iron was effected by means of a strong heat. The product was a homogeneous steel, although, according to calculation, it could not contain more than 0·6 per cent. of carbon. The best, hardest, and most tenacious steel was obtained by fusing mixtures in which the calculated per centage of carbon was 1·5 or 1·6. For this purpose the crucible was charged with 24 or 25 lbs. of bar-iron, and 8 lbs. of pig-iron.

11. The cast-steel, even that which is soft, and in which the per centage of carbon is only 0·6, differs essentially from the raw or melted steel from the circumstance that it cannot be welded without great difficulty. With a higher per centage of carbon it can only be welded under a coating of borax. With a per centage of 1·25, it can no longer be welded at all. Although, on the one hand, this behaviour of the cast-steel obtained in this way indicates its homogeneity, still it is a defect, one, indeed, which is likewise possessed by the English cast-steel in a somewhat less degree.

12. The cast-steel bears only low tempering heat, and acquires a very high degree of hardness, although at the cost of its tenacity. The proper mode of tempering it still remains to be ascertained.

13. The steel may be used for making the finest kinds of cutlery for files and chisels. For all purposes in which it is submitted to sudden and violent blows, it has proved destitute of the requisite tenacity. While very hard, it possesses considerable brittleness.

14. The last-mentioned character of the steel affords a ground for doubting its certainly apparent homogeneity, and this conjecture is confirmed by the fact, that its tenacity and capability of being welded are considerably increased by remelting. If, however, it should prove to be impossible to produce a good cast-steel in one melting, the economical advantages of this process would probably be altogether lost.—*Scientific American.*

SIR W. R. HAMILTON'S "QUATERNIONS."

(*Continued from page* 191.)

Let it be clearly understood that we do not intend to imply that this notation is thus employed in the application of *common algebra* to analytical geometry, when the symbol $\sqrt{(-1)}$ is of course to be interpreted just in the same way as when ordinary algebra is applied to any other subject. The distinction may be seen by any one who will attempt to interpret in this manner the expression

$$y=c+b\sqrt{-1},$$

derived from the equation to a curve

$$y=f\,(x)\ldots\ldots\ldots(\mathrm{I})$$

by making $x=$some value (a). For if such a meaning of $\sqrt{-1}$ were here admissible, we ought to arrive at a point on the curve denoted by equation (I), if we first measur a distance (a) along the axis of (x); then a distance (c) in the direction of that of (y); and lastly from the extremity of this ordinate proceed in a course perpendicular to the said ordinate, and towards the axis of (y) through a distance indicated by (b). Take, for instance, the equation to the ellipse

$$y-b=\frac{b}{a}\sqrt{a^2-x^2}\ldots\ldots\ldots(\mathrm{II})$$

put $x=2a$, and we get

$$y=b+b\sqrt{-3}.$$

But in order that this might give a point on the curve (II) by constructing for the value of (y) two straight lines at right angles to one another, it is plainly needful that the term in $\sqrt{-1}$ should be

$$a\sqrt{-1}.$$

And therefore the only interpretation of this expression for (y) is that there is no value of (y) that will satisfy equation (II.) if x be made $=2a$. Thus no other meaning than that of implying impossibility can be assigned to $\sqrt{-1}$ as it occurs in common modes of notation.

In fact, if we are to make use of this symbol for defining directions, we must employ a system of notation specially adapted to the purpose. In such a system a line of length (a) inclined to the axis of (x) at an angle of 45°, is properly represented by $a\,i^{\frac{1}{2}}$, exactly as a line at right angles to that axis is represented by $a\,i$, or $a\,(-1)^{\frac{1}{2}}$, and generally for a line AE of length (a) inclined at any angle ϕ to the axis of (x), we may write

$$\mathrm{AE}=ai^t,$$

$$\text{where } t=\frac{2\phi}{\pi}.$$

With the same notation curves are represented by equations. Thus,

$$r=a^t\,i^t$$

is the equation to the logarithmic spiral

between the radius vector r and the direction indicated by i^t, and in it for every value of t we should get a corresponding value for r, precisely as with the common equation to this curve. Another example of this mode of representing curves is the following:

$$r = t.\, a.\, i^t.,$$

the equation of the spiral of Archimedes, in which the length of the radius vector varies as its inclination to the prime radius. And generally the $=^n$ to this class of spirals, which in common polar co-ordinates is denoted by $r = a\,\theta^n$, may be transformed into

$$r = a\,t^n.\, i^t.$$

Here, of course, the symbol r is supposed to express not only the length of the radius vector, but its direction also.

The advantages of this notation, if any there be, we shall have an opportunity of seeing as we proceed. This (which apparently is an advantage) is manifest, that we express by one quantity ($a\ t^n\ i^t$) what in common analytical geometry require two symbols to denote, viz., the length of straight line measured from a fixed point, and its direction in relation to another known straight line; for we may write the expression

$$a\,t^n\ i^t$$

alone, as the symbol of the curve, which, in common polar co-ordinates, is represented by the equation

$$r = a\,\theta^n.$$

It would perhaps be difficult to extend the use of this notation to the equations to all curves in a plane; but it is far more difficult to make a full use of it in the geometry of solids, in which (as we have said) we require at least two symbols ($i\,j$) to indicate rotary operators acting in two planes at right angles to one another, and passing through the line on which we propose to measure simple, positive, or negative lengths, such that we may say

$$i^2 = j^2 = -1,$$

but not

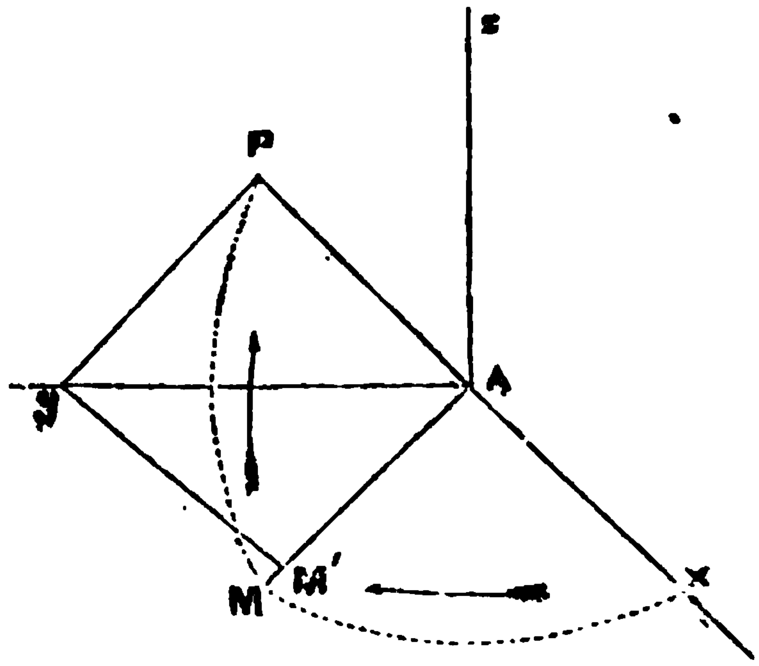
$$i = j = \sqrt{-1}.$$

Indeed, since there is an indefinite number of planes in which the revolution of a straight line in space from positive to negative may take place, we may assume an indefinite number of operators of the $i\,j$ kind, of each of which we may say that its square is equivalent to (-1), but may not say that *it* is therefore equivalent to $\sqrt{-1}$; for this would be to say of *all* that they are equivalent to each other—a proposition by no means true.

These difficulties, though they are certainly as important as those arrived at by the use of $\sqrt{-1}$ as commonly employed, may not perhaps lead to any confusion in a system invented to apply the use of imaginaries to "tridimensional" geometry.

Here is a method that has been suggested by some one, we know not whom. Suppose that any straight line, of given length and direction (r), and commencing at a given point in space, has been arrived at by two motions from a known line having the same initial point, about that point; first through an angle (θ) in a known plane, and then through another angle (ϕ) in a plane perpendicular to the former. Thus, in (fig. 2),

Fig. 2.



let Ax be the known direction of reference, yAx the known plane, AP the straight line to be represented; APM the plane of projection of AP on that of xy.

Then $\angle$ NAM $= \theta$
$\angle$ MAP $= \phi$.

Now, suppose i, j, to be two "quadrantal operators," i acting in the plane yAN, and j in the plane MAP; and let the lengths AN, AM, AP each $= a$. We may then write

$$\mathrm{AM} = \mathrm{AN} \times i^{\frac{2\theta}{\pi}}$$

$$\mathrm{AP} = \mathrm{AM} \times j^{\frac{2\phi}{\pi}}$$

Hence $\mathrm{AP} = \mathrm{AN} \times i^{\frac{2\theta}{\pi}} \times j^{\frac{2\theta}{\pi}}$
or, more neatly,

$$\mathrm{AP} = a \cdot i^t \cdot j^\tau$$

$$\text{if } t = \frac{2\theta}{\pi},$$

$$\text{and } \tau = \frac{2\phi}{\pi},$$

not a symmetrical notation, seeing that i re-

presents motion about a fixed, and j about a varying axis. We will add one other method.

Referring to figure 2, let us denote the position of AP by the angles which its projecting planes make with the planes of xAy and xAz, assuming (i) to represent the motion of line (a) about Ay, and (j) that about Az. Thus we may write

$$AP = a\, i^t j^r \quad . \quad . \quad . \quad \text{(IV.)}$$

$$\text{where } t = \frac{2 \times \angle PyM'}{\pi}$$

$$r = \frac{2 \times \angle MAN}{\pi}$$

Py and M$'y$ being perpendicular to Ay.

It is manifest that this notation, though it has the merit of being symmetrical, is incapable of determining the situation of any line in the plane (yz), as for every line in that plane we should have the same expression, viz.,

$$a,\ i,\ j.$$

This is a serious defect, but it is one which has its equivalent in every symmetrical system of triplets of this kind, which we have seen.

It would seem from the preface to the "Lectures on Quaternions," that their author had attempted to construct a system of triplets in which a straight line of given direction in space was represented by an expression of the form

$$x+iy+jz,$$

x, y, z, being the rectangular co-ordinates of one extremity of the said line, measured from the other as origin i, j, pointing out the directions in which they are measured, and the square of each being equivalent to (-1). Here the composition of lines is performed in the same way as the composition of forces. Another such line would be represented by

$$a+ib+jc.$$

The author, it seems, desired to have such a mode of denoting straight lines, that the product of the expressions representing two of them, should be another of the same form, and so represent another straight line different generally from the two factor lines in both magnitude and direction. This would appear to be impossible to any mathematician who may have contracted any prejudices with regard to the dimensions of an expression. But here is the operation:

$$(a+ib+jc)(x+iy+jz)$$
$$=(ax-by-cz)+i(ay+bx)+j(az+cx)+ij$$
$$(bz+cy).$$

That this may be a triplet of the required form the term in (ij) must vanish or be itself resolved into a triplet, such as

$$ij=a+i\beta+j\gamma.$$

This is, as will appear to our readers, certainly a very strange result: *The product of two operators, whose office is that of turning a line through an angle*

$$\frac{\pi}{2}$$

each in a given plane, the theory of triplets (says our author) seems to require should be of the form

$$a+i\beta+j\gamma,$$

where a, β, *and* γ *represent "three constant numbers."* This theory must certainly be a curiosity, particularly if we consider, as we suppose we must from analogy, that this triplet represents a straight line. Another instance of this kind of incongruity immediately follows. "In that particular case," when the two factor lines are in a plane passing through the axis of x, "there was ready a *known* signification for the product line, considered as the fourth proportional to the unit line (assumed here on the last-mentioned axis), and to the two co-planar factor lines. And I found, without difficulty, that the co-ordinate projections of such a fourth proportional were here,

$$ax-by-cz,\ ay+bx,\ az+cx."$$

The apparent correctness of this result might seem to verify the process by which it was obtained. But a moment's consideration will show that an assumption is here made, which the nature of multiplication of lines by no means justifies; viz., That a unit of length multiplied by a unit of length is equal to another unit of length; and we believe no definition of multiplication can be invented which will include the common process, and, at the same time, that which Sir William here denominates by the same term.

However, such being the co-ordinates of this fourth proportional line, the triplet expressing it would be the first three terms in the above product of two triplets. Hence in this case, the fourth term

$$ij(bz+cy)$$

ought to disappear.

Now this cannot be made to vanish in any way but by assuming

$$ij=-ji,$$

and then, since we have the condition

$$bz-cy=0,$$

because of the "coplanarity" of the two factor lines and the axis of x, therefore

$$ij.bz+ji.cy=ij\ (bz-cy)=0$$

in this case.

It is apparent that if

$$ij=-ji$$

be necessary in this case, it must be necessary generally, for i and j bear always the

same meaning; or, at the least, they ought to. Assume, therefore, proceeds the preface,

$$ij=k, ji=-k,$$

"the value of k being still left undetermined."

Hence, generally,

$$(a+ib+jc)(x+iy+jz)=(ax-by-cz)$$
$$+i(ay+bx)+j(az+cx)+k(bz-cy).$$

The form of this expression led to the supposition that k must be a new "unit operator," similar to i, j, and such that k, i, j, are symmetrical with regard to each other, or

$$ki=+j \quad ik=-j$$
$$jk=+i \quad kj=-i$$
$$k^2=-1 \quad j^2=-1 \quad i^2=-1,$$

and the expression for a straight line was no longer written

$$x+iy+jz,$$

but symmetrically

$$ix+jy+kz.$$

This set of suppositions enables us to represent the desired product of two straight lines in space by a "Quaternion," thus,

$$(ix+jy+kz)(ix'+jy'+kz')=\omega''+ix''+$$
$$jy''+kz'',$$

where $$\omega''=-xx'-yy'-zz'$$
$$x''=yz'-zy'$$
$$y''=zx'-xz'$$
$$z''=xy'=yx',$$

and it is shown that the product of any two such "Quaternions," such as

$$a+ib+jc+kd,$$
$$a_1+ib_1+jc_1+kd_1,$$

is another Quaternion of the same form,

$$a_2+ib_2+jc_2+kd_2.$$

This property led the author subsequently to devote himself to the development of "Quaternions" alone.

Every one who sees the endeavour to construct a system of triplets in connection with geometry of three dimensions, analogous to the couplets of plane geometry, thus abruptly abandoned, will, we doubt not, be taken by surprise, and will naturally expect full and satisfactory reasons to be rendered for the step, but only to be still further disappointed when he finds his expectation wholly vain. Nowhere has our author given any other reason for assuming

$$k^2=-1$$

rather than

$$k^2=+1$$

than, that choosing any one direction rather than another as eminent, is a violation of the idea of the symmetry of space. If this be allowed, then to choose any one direction rather than another, to be designated by *any* symbol, must be regarded in the same light. If to indicate a particular direction by the symbol $(+1)$ be to violate the notion of the symmetry of space, certainly to choose one particular direction and denote it by the symbol, k, is so too. We cannot think that *such* a reason has induced Sir William Hamilton to reject triplets, which may be made to have a meaning, and adopt "Quaternions," which, it would appear, *can have none*. And what makes all this the more inexplicable to us is, that the suppositions needful for the former are, apparently, far more simple than those required by the latter.

Moreover when everything possible is done in the service of a Quaternion, we can attach no intelligible meaning to it. What *can* be made of "a number and a line" when connected by the sign $+$ as the result of the multiplication of the expressions for two lines, with no abstract numbers joined to either? How can the phenomenon of the appearance of an abstract number in such a result be accounted for? We should treat it as an absurdity. Let us put what we mean in a clearer light. It is a principle pretty well understood in mathematics, that numbers are used only as adjectives or coefficients; the unit of which they are the coefficients, or the noun (of magnitude or quantity) of which they are the adjectives, being "expressed or understood:" and numbers are never used independently or abstractedly but when this unit may be *anything*. So a proposition about numbers in the abstract, is a proposition concerning any, or all kinds of magnitudes, or things, the numbers standing independent of *any unit*, because *all* cannot be written with convenience. Thus in the proposition—*two and three are five*, we may write the noun—dogs, or houses, &c. This proposition in full is, of course, *three things plus two things of the same kind=five things of that kind*. But here is one that will serve our present purpose better—*two things of the* (a) *kind, plus three of the same, plus* 2 *feet =five things of the* (a) *kind plus* 2 *feet;* we might write this:—

$$3+2+2 \text{ feet}=5+2 \text{ feet}.$$

Where in connection with the abstract numbers we may write any unit we please, thus,

3 houses+2 houses+2 ft.=5 houses+2 ft.

Now apply this to a Quaternion, which is led off by a number, and we have

$(ix+jy+kz)\,(ix'+jy'+kz')$=a certain number (of houses say)$+ix''+jy''+kz''$ where x, y, z; x', y', z'; x'', y'', z'', are cer-

tain lengths, and i, j, k, "quadrantal versors."

Whether Sir William really means this we cannot tell, but so it appears anyhow. Indeed it is difficult, if not impossible, to assign any other meaning for ω'', seeing that if it be a length it must have a direction, but this theory provides no direction for it; it must therefore be an abstract number, that is it may be anything.

It must be evident to every one who attends to the subject, that in forsaking the pursuit of a system of triplets the author has left the only path by which it is possible to arrive at a mode of notation bearing any analogy to the couplets of plane geometry. It is true that objections can be raised against the necessary details of their construction; but then, more serious objections can be raised against those of the construction of the Quaternions, and these all in addition to what we have said in their disfavour.

(*To be continued.*)

SPECIFICATIONS OF PATENTS RECENTLY FILED.

William Fraser Rae, of Edinburgh, Mid-Lothian, brass-founder. *Improvements in gas-heating and cooking apparatus.* Patent dated November 15, 1852. (No. 754.)

This invention relates to various arrangements of apparatus intended to produce a more economical and effective application of heat to warming and cooking purposes. In one of these arrangements the stove consists of a pair of vertical cylinders placed concentrically one within the other, leaving an annular space between the two, and attached to a base perforated to admit air. On the tops of the cylinders is placed a diaphragm of wire gauze, or other such material, above which is fitted a single or double dome-shaped top, carrying a vessel for holding water. The gas-burners may be placed either within the inner cylinder or between the two, the burner being either a perforated tube, or an arrangement of fan, union-jet, fishtail, bats-wing, or similar burners. In applying the invention to the heating of water, baths, or reservoirs, three cylinders are used, one within the other, the innermost one having a series of short horizontal open-ended pipes passed through it. The water of the bath circulates through two pipes, one connected with the top and the other with the bottom of the apparatus. The gas is consumed in a chamber beneath the cylinders, and the heated air passes up through the inner cylinder, and between the outer and the middle one. For cooking stoves the chambers are also constructed with an external air space, one rectangular chamber being placed within another, the inner one being divided by shelves, and having the gas-burners placed beneath it, with a curved or overhanging cover above them, a space being left between the top of this cover and the bottom of the inner chamber, through which the heated air is allowed to pass before it ascends between the two chambers, and passes off by a suitable discharge-pipe fitted in the external one. A reflector is placed behind the burners, which, with the lining of the inner chamber, is formed by preference of enamel. Above the chambers is a double top, divided into compartments, in which gas is burnt for boiling and other cooking operations, and on the top a boiling and steaming apparatus may be placed and heated by a pipe or pipes from the stove beneath.

Claims.—1. The general arrangement described.

2. The mode of constructing gas-heating apparatus with duplex chambers, to produce heated air spaces in combination with an expanded concave cover or top to diffuse and conduct the heat.

3. The application and use of reflectors to heating and cooking apparatus.

4. The use of a concave reflector beneath heating and cooking burners.

5. The use of overhanging covers for protecting gas-burners.

6. The mode of arranging heating and cooking apparatus, in which the burners are made to heat the gas prior to its combustion.

7. The use in such apparatus of burners of the batswing or fishtail class, or others in which the flame is diffused and the smoke consumed.

8. The use in such apparatus of enamelled reflecting surfaces on the inner side of duplex air-chambers or spaces.

9. The mode of heating water, and producing a heating fluid current by means of an annular water space, with tubular connections as described.

10. The mode of "deflecting and diffusing" the heated air by means of a deflecting cover as described.

11. The mode of heating boiling or steaming apparatus by means of air-passages passing through such apparatus, and communicating with burners beneath.

Thornton Littlewood and Charles Littlewood, of Rochdale, Lancaster, woollen manufacturers. *Improvements in machinery or apparatus used in the preparation of wool, silk, flax, and mohair, to be spun.* Patent dated March 1, 1853. (No. 507.)

The Messrs. Littlewood's improvements relate chiefly to the feeding of the carding-engine or scribbler with wool or other material, which they spread on cloths that are afterwards lapped on rollers, and fixed on suitable bearings on the front of the engine. The cloth, with the wool upon it, is passed to the rollers of the scribbler or carding-engine, which, by revolving, draw it up, and consequently feed the engine. The machinery for spreading the wool on the cloth and winding that on the roller consists of eccentric tappets, or similar contrivances fixed on the driving shaft between the pulleys and frames, so that at every revolution of the shaft they press down a compound lever furnished with a ratchet, which acts upon a ratchet-wheel attached to another shaft, crossing the frame near the lap or taking-up rollers, these rollers turning and rising in irregular-shaped slots made in plates or standards on both sides of the frame.

William Edward Newton, of 66, Chancery-lane, Middlesex, civil engineer. *Improvements in capstans.* (A communication.) Patent dated March 1, 1853. (No. 510.)

Claim. So constructing capstans that they may be made to produce a quick and direct action to overcome a slight resistance, or a slow and more powerful action to overcome a great resistance by merely turning the drum-head round in opposite directions, while the barrel of the capstan always moves in the same direction; the different effects being accomplished without any "shipping or unshipping of gears" by means of a system of ratchets, pauls, wheels, and pinions.

Edward Charlesworth, of York, gentleman. *Improvements in bill or letter-holders.* Patent dated March 1, 1853. (No. 511.)

This invention consists of a wire pointed at one end, and hollowed out at the other, and then bent into a spiral form, the ends passing each other, so that when it is pulled into the form of a ring, and has its pointed end inserted in the hollow of the other, it may have a springing tendency to keep in that position. The ring is fitted to a handle, and when a letter is to be filed, the parts of the ring are forced apart, and the letter is passed over the pointed end, which is then again placed in the other as before. The inventor also describes certain rings which may be attached to the bill or letter for the purpose of preventing the letter from being formed.

The inventor's claims comprise the above.

William Romett, of Liverpool, Lancaster. *Improvements in making paddle-wheels for vessels propelled by motive power, which is called "The Cylinder Paddle Wheel."* Patent dated March 1, 1853. No. 512.)

These improvements are said to consist in making the floats of a cylindrical form, either solid or hollow, "or shaped to any polygon form of any shape that may be described either within a circle or an ellipse, and of any dimensions that may be required for the use of vessels propelled by any description of motive power."

John M'Adams, of Massachusetts, United States. *Improvements in machinery or apparatus for printing on leaves of books their designations, numbers, or devices, or those of their pages, which machinery or apparatus may also be used to advantage for printing designating numbers or devices on various other articles.* Patent dated March 1, 1853. (No. 514.)

This invention relates chiefly to a method of printing the numbers upon the pages of blank books after they are bound, and consists in applying the types so as to print simultaneously upon opposite sides of the alternate leaves, and thus complete the work as it progresses; and also in a manner of constructing and combining the several parts of the machine so as to effect the printing of the odd and even numbers of the alternate leaves of the bound book by one movement of the treadle worked by the foot of the operator.

Robert Lewin Bolton, of Liverpool, Lancaster, merchant. *A new mode of obtaining and using power by explosion of gases.* Patent dated March 1, 1853. (No. 515.)

The inventor introduces two or more gases into a cylinder or other receptacle, and then unites and explodes them by an electric or galvanic spark, or in another suitable way. He says, "I claim no particular arrangements for gas-holders, for machinery, or for any particular way of eliciting the spark at the right time, but I do claim for making available the power produced by the explosion of gases"!!

Laurence Hill, Jun., of Glasgow, Renfrew, shipbuilder. *Improvements in the production of motive power.* (A communication.) Patent dated March 2, 1853. (No. 516.)

Claim.—"The heating and expanding of air in closed vessels, by direct contact or admixture with steam or heated vapour, for the purpose of producing motive power."

Charles Henry Hall, of Liverpool, Lancaster, cook. *An improved apparatus for cooking by gas or vapour.* Patent dated March 2, 1853. (No. 517.)

This invention has for its object the construction of apparatus in such manner as to cause a certain decomposition and conversion of the gas or vapour used therein, by

which the carbon of common coal-gas becomes changed into carbonic oxide, which combines with the hydrogen of the gas and produces a compound applicable to cooking. The conversion described of the carbon is effected either by mixing it with air during its ascent through a perforated cylinder, or by passing it through an open disc and presenting a flat surface of metal to it while in a state of combustion.

Claim.—The construction of apparatus by which ordinary coal or other gas, or vapour from spirits, may be decomposed and aërated, and in this state used for cooking.

JOHN SMITH and WILLIAM HENRY SMITH, both of 8, Upper Fountain-place, City-road, Middlesex, and ALEXANDER WILLIAMS, of 15, Seething-lane, Great Tower-street, London, manufacturers. *Certain improvements in metallic plates, and in producing devices and ornamental patterns thereon, and in the apparatus and machinery to be used for such purposes.* Patent dated March 2, 1853. (No. 521.)

"We can," says the inventors, "obtain a superior surface, as hereafter stated, and we can produce devices or ornamental patterns by embossing or impressing in a continuous manner on the surfaces of metallic plates any desired device, pattern or ornament, by means of steel or steel surface-rollers, impressed, chased, or engraved when in a soft state, with the required device, pattern or ornament in reverse of what is intended to be produced on the plate, and afterwards hardened.

"The plates are to be passed through two rollers, one having the pattern thereon, and the other being a pressure or counter roller, and when it is required to bring the plate out flat it must be passed through ordinary bending or flattening rollers, which may, if desired, be attached to the first-named rollers."

Claim.—"Improvements in metallic plates, especially tin plates, and in producing devices or ornamental patterns thereon by the use and adoption of the improvements in the apparatus and machinery to be used for those purposes," as described.

EDWARD DUKE MOORE, of Ranton Abbey, near Eccleshall, Stafford, merchant. *An improved mode of treating the extract of malt and hops.* Patent dated March 2, 1853. (No. 522.)

This invention consists in evaporating "wort" in suitable pans, keeping it stirred, and the surface clear of scum during the process, by this means rendering it more portable; and also in making a concentrated extract of malt and hops, by means of a water-bath maintained at a temperature considerably below the boiling point of water, whereby evaporation and concentration can be carried on without injury to the quality of the extract.

The inventor's claims comprise the above processes.

LEWIS JENNINGS, of Fludyer-street, Westminster, mechanical engineer. *An improved apparatus for regulating the speed of machinery.* Patent dated March 2, 1853. (No. 523.)

The nature of this invention may be seen from the following claims:

1. Obtaining and applying the variable motion for effecting the required regulation of speed in machinery by means of a traversing-screw or other propeller working in air, water, or other such substance.

2. The use of the eccentric or cam-cone for imparting motion to the arms or levers of throttle-valves of engines, or to the driving-band or strap-lever of machinery generally.

ROBERT WADDELL, of Liverpool, Lancaster, engineer. *Improvements in steam engines.* Patent dated March 2, 1853. (No. 525.)

The *first* part of this invention relates to a self-acting arrangement, by which the water of the condensers of steam engines is hindered from overflowing and entering the cylinders. A slide-valve, placed on the outside of the condenser, has attached to it a lever carrying a float, which rises as the water accumulates, and ultimately opens the valve; and at the same time the injection-water is shut off by means of a valve worked by the same float.

The *second* part relates to various methods for obtaining an equilibrium of pressure on the back and face of steam slide-valves, as well as those constructed on the expansion principle by the agency of steam.

The *third* part refers to the application of a governor for regulating the speed of engines in steam vessels propelled either by the screw or by paddle-wheels, when such are pitching or rolling in a seaway, and consists in connecting a throttle-valve with a cylinder, which submits to the action of a spring when the pressure of the external fluid is taken off its outer end.

The *fourth* part of it relates to improvements in pumps, and consists in attaching two or more valves to the bucket and lower box, so that should either become gagged, the other will work.

No claims are stated by the inventor.

MARCEL VETILLART, of Le Mans, France. *Improvements in drying yarns.* Patent dated March 2, 1853. (No. 526).

Claim.—A method described of arranging apparatus for drying yarns, by placing them upon frames and subjecting them to the action of a current of air, in such man-

ner that the air when it enters hot and dry acts first on the yarns which are the least damp, and then, in succession, as the air becomes cooler and less dry, on yarns more and more damp.

Charles Humage, of King's Norton, Worcester. *The application of certain materials to the manufacture of coffin furniture.* Patent dated March 3, 1853. (No. 531.)

This invention consists in the application of paper, paper pulp, woven fabric, and gutta percha, *suitably* embossed, gilded, silvered, or otherwise ornamented, to the formation of lace, handle-plates, breast-plates, and other ornaments of coffins.

Robert Barclay, of Montrose, Forfar, North Britain, merchant. *Improvements in obtaining motive power, and in transmitting aëriform bodies and fluids.* Patent dated March 3, 1853. (No. 532.)

This invention relates chiefly to a rotary engine, consisting of an external fixed cylinder set with its axis horizontal, and having the main driving shaft passing through its centre. This cylinder or case contains a smaller hollow piston disc, set eccentrically to the main axis, and fitted so as to roll steam-tight round the interior of the outer chamber, the contact between the two being maintained by an internal wheel or roller carried on the pin of a short crank placed on the main shaft. A parallel block of metal of the same width as the revolving piston, is fitted so as to slide vertically between the two end covers of the fixed cylinder. This metal block affords the necessary resistance to the pressure of the steam.

Samuel Colt, of Spring-gardens, Middlesex, gentleman. *Improvements in rotating breech fire-arms.* (Partly a communication.) Patent dated March 3, 1853. (No. 535.)

Claims.—The rotating and the locking of the breech-cylinder by means of a traversing-pin working in grooves formed on the periphery or near end of the cylinder; and also, a mode of releasing the traversing-pin from the groves when the cylinder is required to turn freely on its arbor.

Samuel Colt, of Spring-gardens, Middlesex, gentleman. *Improvements in rotating breech fire-arms.* (Partly a communication.) Patent dated March 3, 1853. (No. 538.)

This invention relates; *Firstly*, to a mode of preventing the arbor or centre-pin on which the breech-cylinder of repeating fire-arms rotates from fouling, in consequence of the entrance of smoke or dirt between it and the cylinder, and also of facilitating the removal of the breech-cylinder from the arm and the insertion of a charge cylinder.

Secondly, to a mode of adjusting the position of the breech-cylinder with respect to its proximity to the barrel.

Thirdly, to certain means of transmitting motion to a plunger which is permanently secured to the fire-arm, and is to be used as a substitute for the ordinary ramrod.

Fourthly, in the case where the barrel is connected to the lock-frame by a hinge-joint, to certain means of bringing the barrel up to its bearing against the lock-frame.

Claims.—1. Constructing the breech-cylinder with a stopped or closed central hole.

2. Supporting the breech-cylinder by means of a centre-pin or arbor projecting from the recoil-shield, and capable of being drawn back to allow the removal of the cylinder.

3. The adjustment of the position of the breech-cylinder with regard to the barrel, by means of a screw nut, or threaded collar, which is made to bear against the rear-end of that cylinder.

4. The use of a creeping fulcrum for transmitting motion to the plunger employed in loading rotating breech fire-arms.

William Edward Newton, of 66, Chancery-lane, Middlesex, civil engineer. *Improvements in primers for fire-arms.* (A communication.) Patent dated March 3, 1853. (No. 540.)

The patentee proposes to employ a disc or wheel made of metal or other suitable substance, around which, and near its outward edge, are made any convenient number of small holes which are to be filled with detonating powder, properly protected by varnish or otherwise from contact with the air. These are so arranged, that they may, by the rotation of a wheel, be brought in turn over the nipple or hole communicating with the interior of the barrel.

Claim.—"The use and application to fire-arms of a disc or wheel provided with any convenient number of holes or recesses for receiving a detonating composition, and which wheel or disc, when adapted to the arm, may be caused to rotate either by drawing back the hammer, or by means of a separate lever."

John Wright, of Camberwell, Surrey, engineer. *Improvements in machinery for manufacturing bags or envelopes of paper, calico, or textile fabrics.* Patent dated March 3, 1853. (No. 541.)

This invention consists of an arrangement of machinery intended to manufacture the articles above-named with unusual economy and expedition, and, when it is required, to print a name, title, or other device upon them.

Claim.—1. The general arrangement of machinery described.

2. "Applying to one or more of the pressing rollers of bag or envelope-making machines, types, stereotypes, blocks, or

other raised printing surfaces for the purpose of imparting any required device to the bags or envelopes while under the process of manufacture."

Thomas Crick, of Leicester, Leicestershire, boot manufacturer. *Improvements in the manufacture of boots, shoes, clogs, and slippers.* Patent dated March 3, 1853. (No. 542.)

This invention consists in using tacks, rivets, or sprigs instead of stitches for fastening the uppers to the soles of the articles enumerated in the title. The article is lasted in the usual manner, and the heads of the tacks or rivets are placed on the interior.

John Hinks, and George Wells, both of Birmingham, Warwick, manufacturers, and co-partners. *A new or improved metallic pen.* Patent dated March 4, 1853. (No. 544.)

Claim.—"The making of a transverse depression on the backs of metallic pens, at or near that part of the said pens where the central slit terminates, whether the said depression extend wholly, or only partially across the backs of the said pens."

Robert Craib Ross, of Edinburgh, Scotland, engineer. *An improved machine or instrument for cutting files and forging metal.* Patent dated March 4, 1853. (No. 545.)

Claims.—1. The adaptation and application to machines for cutting files of a striking lever and controlling spring, "capable of acting upon various points of the lever in relation to its centre of suspension."

2. The adaptation and application to machines for forging metal of a striking and controlling spring, "capable of acting in like manner and with like effect upon the striking power of the lever, such machines or instruments being adapted to turn while striking," as described.

George Elliot, of St. Helen's, Lancashire, manufacturing chemist. *Certain improvements in manures.* Patent dated March 4, 1852. (No. 546.)

The object of these improvements is the production of materials applicable to manuring purposes by converting certain fatty and animal matters into a species of alkaline or earthy soap, which may be treated as convenient. When potash or soda is used as the alkaline part of the combination, it should be previously rendered caustic by lime as in the ordinary process of soap-making. In order to effect the required combination, the fish, or other animal matter, is placed in iron pans, to which heat is applied, and the caustic leys of soda or potash, or the lime, as the case may be, are added. The mixture is then boiled down until it becomes so thick that it is difficult to stir. When potash is used the process is carried no further than this, as it then forms a soft soap which cannot be easily reduced to powder by drying, but may be diluted with water and used as a liquid manure. When, however, soda or lime is the material employed, when the mixture is reduced to the state above described, it is to be transferred to iron plates heated by steam, on which it is spread to a thickness of about half an inch. It is there dried, and subsequently crushed, after which it is fit for use as a manure. In the process of boiling down, a vessel containing chloride of calcium is placed between the fire and the vessel containing the mixture, to prevent its burning.

Claim.—The manufacture or production of a material or materials applicable to the purposes of manures by the saponification of oily, fish, and refuse animal matters, as described.

PROVISIONAL PROTECTIONS.

Dated August 1, 1853.

1788. John Smeeton, of Limehouse, Middlesex, export outfitter, &c. Improvements in the manufacture of tablets and dial-plates, applicable to showing the distances of carriages travelling, barometers, compasses, and timepieces.

Dated August 2, 1853.

1804. William Henry Clarke, of Great Marlborough-street, Middlesex, peat and manure merchant. Improvements in the manufacture of a composition resembling papier-maché and carton pierre, and applicable to the same purposes to which papier maché and carton pierre are applied, parts of which invention may also be applied to the construction of ships and boats, and roofing. A communication.

Dated August 6, 1853.

1842. Henry Southan, of Gloucester, gentleman. Improvements in ploughs.

Dated August 16, 1853.

1912. James Stewart, of St. Paul's road, Camden-square, Middlesex, pianoforte-maker. Improvements in pianofortes.

1914. Edward Finch, of Bridge Works, Chepstow, engineer, and Charles Lamport, of Workington, shipbuilder. Improvements in the masts and rigging of ships.

1916. John Atherton, of Preston, machine-maker, and James Abbott, of Accrington, cotton-spinner, of Lancaster. Certain improvements in and applicable to machines for winding yarn or thread, called "winding machines," used in the manufacture of cotton and other fibrous substances.

1918. George Richardson, of the Eastern Counties Railway, Shoreditch, Middlesex, civil engineer. Improvements in railway signals, and in the means of preventing accidents upon railways, and in the apparatus connected therewith.

1920. Alfred Vincent Newton, of 66, Chancery-lane, Middlesex, mechanical draughtsman. Improvements in the distillation and purification of rosin oil. A communication.

Dated August 17, 1853.

1921. John Heritage, of Warwick, builder. An improvement in the manufacture of bricks, pipes,

tiles, coping, and such other articles as are or may be moulded in clay.

1922. Samuel Perkes, civil engineer, 1, Walbrook, City, London. Improvements in the construction of cocks and such like articles. A communication.

1924. Thomas Clark Ogden, of Manchester, Lancaster, cotton-spinner, and William Gibson, of the same place, manager. Improvements in machinery or apparatus for preparing, doubling, and twisting cotton and other fibrous materials.

1925. Thomas Kirkwood, of Edinburgh, plumber. Improvements applicable to ventilation and other purposes.

1927. George Leedham Fuller, of 13, St. Mary's-road, Peckham, Surrey, civil engineer. Improvements in steam engines.

1928. Joseph Hart Mortimer, of 1, Chester-place, Old Kent-road, Surrey. Improvements in lamps.

Dated August 18, 1853.

1929. Robert Clough, of Liverpool. Improvements in the construction of ships and other vessels.

1930. David Chalmers, of Manchester, Lancaster, manufacturer. Improvements in machinery or apparatus for cutting the pile of woven fabrics.

1931. David Harkes, of Mere, Chester. Improvements in machinery or apparatus for mowing, reaping, or other similar purposes.

1932. Alexis Pigé, of Greek-street, Soho, Middlesex, gentleman. Improvements in locks and their keys. A communication.

1933. William Symes, of Pimlico, Middlesex, gentleman. An improved fruit-cleaning machine.

1934. Jean Larmanjat, of Paris, France. Certain improvements in obtaining motive power.

1935. Peter Fairbairn, of Leeds, York, machinist. Certain improvements in heckling-machines.

1936. William Curtain, of Retreat-place, Homerton, Middlesex, carpet designer. Improved machinery for printing textile fabrics, oil-cloths, leather, paper-hangings, and other similar fabrics or materials.

1937. William Cornelius, of Panton-street, Haymarket, Middlesex. Improvements in gilding porcelain, glass, and such like materials. A communication.

1938. Auguste Mathieu Maurice de Bergevin, of Paris, France. Improvements in the manufacture of coke, and in the apparatus connected therewith, and in treating the products obtained therefrom. A communication from Monsieur Gillaume Louis Edouard Buran, of Paris.

1939. Thomas Hughes, of Birmingham, Warwick, brassfounder. An improvement or improvements applicable to writing slates, pocket and memorandum-books, and other such like articles.

Dated August 19, 1853.

1940. Frederick William Alexander de Fabeck, of No. 6, Portland-road, Middlesex. The construction of viaducts, bridges, lintels, beams, girders, and other horizontal structures and supports.

1941. Alfred Lutwyche, of Birmingham, Warwick. An improved mode of manufacturing steel or other metallic pens.

1942. Charles Watt, of 15, Selwood-place, Old Brompton, and Hugh Burgess, of 7, Percy-street, Bedford-square, both of Middlesex. Improvements in disintegrating and pulping vegetable substances.

1943. George Heyes, of Bolton, Lancaster, manufacturer. Improvements in looms.

Dated August 20, 1853.

1944. James Kimberley, of Birmingham, Warwick, wholesale ironmonger and manufacturer. An improvement or improvements in raising and lowering various kinds of window-blinds, and in opening and closing window and other curtains, applicable also to the raising and lowering, or winding and unwinding of maps and other sheets or articles, and to the closing of doors.

1946. Jean Baptiste Polaillon, gentleman, and François Maillard, starch manufacturer, both of Lyons, France. Improvements in the manufacture of starch.

1947. Robert Moore Sievier, of Louviers, France, manufacturer. Improved machinery for the manufacture of terry or cut-pile fabrics, parts of which are applicable to the weaving of other fabrics.

Dated August 22, 1853.

1951. Samuel Lomas, Manchester, manager. An improved silk-cleaner.

1953. Auguste Edouard Loradoux Bellford, of 16, Castle-street, Holborn, City, London. Improvements in the manufacture of certain mineral oils and paraffine. A communication.

1955. Frederick Osbourn, of Albion-street, King's-cross, Middlesex, tailor. Improved machinery for cutting woven and other fabrics.

Dated August 23, 1853.

1957. William Brown, of Glasgow, merchant. An improved mode of obtaining volatile products from bituminous coals, and other bituminous substances.

1959. James Webster, of Leicester. Improvements in pressure-gauges.

1961. William Rettie, of Aberdeen, Scotland, lamp-manufacturer. An improved construction of submarine lamp.

1963. John Whiteley, of the firm of Whiteley, Ward, and Co., lace-manufacturers, of Stapleford, Nottingham. Improvements in warp-machinery for the manufacture of textile fabrics.

1965. William McLeish, of Battersea, Surrey. A machine for destroying weeds.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," September 2nd* 1853.)

716 Charles Victor Frederic de Roulet. Certain improvements in the manufacture of piled figured fabrics, by alterations in and additions to looms for weaving, including also a warping-machine, with a method of reading and arranging the colours or materials for the patterns of such figured fabrics.

755. John Pym. Improvements in the permanent way of railways.

902. John Bethell. Improvements in the manufacture of flax.

(*From the "London Gazette," September 6th,* 1853.)

781. Henry Spencer, Henry Tattersall, and Hugh Simpson. Certain improvements in machinery or apparatus for preparing and spinning cotton and other fibrous materials.

810. William Mavity. A new or improved method of manufacturing letters and figures to be used as printing type, lettering for sign and window-boards, and other such like purposes.

847. George Humphrey. An improved self-acting safety-valve for locomotive, marine, and other steam boilers.

871. Henry Blake. Improvements in railway wheels.

881. Robert John Kaye and John Ormrod Openshaw. Improvements in obtaining motive power by electro-magnetism.

918. William Allen and William Murrell. Im-

rovements in the mode or modes of cleansing bottles or other similar articles.

925. Joseph Cooke and William Cooke. New r improved machinery for cutting or shaping rks and bungs.

39. Thomas Newey. Improvements in fastenngs for articles of dress.

9 59. Thomas Dunn. Certain improvements in nd applicable to boilers or apparatus for geneating steam, and in apparatus connected therewith.

9 75. Jerome André Drieu. Improvements in utting the pile of velvet, velveteens, and other piled fabrics.

989. Charles Léon Desbordes. Improvements in instruments for measuring the pressure and temperature of air, steam, and other fluids.

1005. William Johnson. Improvements in machinery for preparing and spinning cotton and other fibrous substances.

1021. Thomas Culpin. Improvements in steam boilers and in the appendages thereto.

1045. Colin Mather. Improvements in apparatus used in bleaching.

1224. Wharton Rye. Certain improvements in kitchen ranges or fire-grates.

1235. Job Allen. Improvements in communicating intelligence.

1256. John Blair. The application of steam power to the working of railway-breaks.

1340. Edward Wilkins. Improvements in pots and vessels for the growth and cultivation of plants.

1348. William Knowles. Improvements in machinery for warping and beaming yarns or threads.

1365. James Spotswood Wilson. A machine or apparatus for digging or raising earth, and applicable to agricultural or engineering purposes.

1466. Richard Archibald Brooman. Improvements in machinery for sawing stone and marble. A communication.

1634. James Parkes and Samuel Hickling Parkes. Improvements in the manufacture of certain drawing or mathematical instruments; also in packing or fitting the same in their cases, which said improvements in packing or fitting are also applicable to the packing or fitting of other articles.

1635. Thomas Restell. Improvements in walking-stick umbrellas, applicable also to parasols.

1732. John Gillam. Improvements in apparatus for cleansing and separating corn, grain, and other seeds.

1750. Charles Frederick Spieker. Improvements in generating and fixing ammonia.

1765. John Knowles. Certain improvements in looms for weaving.

1812. John Slack. Improvements in reeds for looms.

1868. Thomas Dewsnup. Improvements in obtaining motive power.

1874. George Deards. Improvements in lamps.

1881. Thomas Turner and John Field Swinburn. Improvements in sights for rifles.

1882. Edward Lavender and Robert Lavender. An improved apparatus for preparing the materials employed in the manufacture of certain composition fire-lighters.

1891. William Aldred, Richard Fenton, and William Crone. Certain improvements in separating or recovering the wool from cotton and woollen or other similar mixed fabrics, whereby the wool is rendered capable of being again employed.

1899. Chandos Wren Hoskyns. Improvements in the application of steam to cultivation.

1911. Richard Archibald Brooman. A method of and machinery for reducing wood and other vegetable fibres to pulp, applicable to the manufacture of paper, pasteboard, millboard, papier maché, mouldings, and other like purposes. A communication.

1912. James Stewart. Improvements in pianofortes.

1920. Alfred Vincent Newton. Improvements in the distillation and purification of rosin oil. A communication.

1924. Thomas Clark Ogden and William Gibson. Improvements in machinery or apparatus for preparing, doubling, and twisting cotton and other fibrous materials.

1928. Joseph Hart Mortimer. Improvements in lamps.

1935. Peter Fairbairn. Certain improvements in heckling-machines.

1942. Charles Watt and Hugh Burgess. Improvements in disintegrating and pulping vegetable substances.

1943. George Heyes. Improvements in looms.

1947. Robert Moore Sievier. Improved machinery for the manufacture of terry or cut-pile fabrics, parts of which are applicable to the weaving of other fabrics.

1957. William Brown. An improved mode of obtaining volatile products from bituminous coals, and other bituminous substances.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed September 1, 1853.

511. Edward Charlesworth.
521. John Smith, William Henry Smith, and Alexander Williams.
550. Henry M'Evoy.
557. Thomas Wells Cross.
558. William Todd.
560. Richard Archibald Brooman.
563. William Barrington.
567. Jacques François Dupont de Bussac.
571. Thomas Weatherburn Dodds.
572. Charles Parker.
574. Thomas Weatherburn Dodds.
577. John Hall and John Crofts.
603. Henry Ransford.
617. James Summers.
621. William Muir.
634. William Edwards Staite.
641. Collinson Hall.
653. Henry Richardson Fanshawe.
680. John Aldridge.
696. John Stather.
710. William Mann Crosland.
946. Thomas Day.
1139. Peter Wright.
1475. Christopher Waud, Edward Waud, and William Busfield.
1557. George French.
1625. Louis Cornides.
1638. Henry Hoskyn Peppin.
1646. Peter Fairbairn.

Sealed September 5, 1853.

1853:

554. Mary Ann Smith.
556. Baldwin Fulford Weatherdon and Charles Dealtry.
819. Thomas Carr.

Sealed September 7, 1853.

569. William Matthews.

Sealed September 8, 1853.

583. Charles Baker.
588. James Veevers and Henry Ashworth.
594. Samuel Blackwell.
595. Samuel Blackwell.
599. George Chambers.
626. Thomas Evans, junior.
640. William Stevenson.
645. François Durand.
648. Ephraim Sabel.
649. George Knight and John Heritage.
652. William Malins.
669. Richard Archibald Brooman.
688. William Whitaker Collins.
744. Luke Smith and Matthew Smith.
778. John Smedley.
828. William Johnson.
861. John Fuller Boake and John Reily.
919. John Lewthwaite.
927. Isaac Simpson.
940. William Hale.
956. Richard Archibald Brooman.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

NOTICE TO CORRESPONDENTS.

A Subscriber, Dublin, asks how far a man who stands upon the shore can see along the surface of the water; and by what law the visible distances vary?

Let x be the height of the eye of the observer above the level of the sea; then, the diameter of the earth being assumed 8,000 miles, and d the required distance

$$x\,(8{,}000+x)=d^2,$$

and

$$d=(8{,}000\,x+x^2)^{\frac{1}{2}}=8{,}000\,x)^{\frac{1}{2}}+$$

terms involving higher powers of x. If any value be given to x in this series, the corresponding value of d will result; but since x will generally be a small fraction of a mile, the amount of all the terms after the first will be inappreciable, and may be neglected, so that the distance of the horizon may be taken to vary with the square root of the height of the observer's eye: let this be 6 feet, then $(8{,}000\,x)^{\frac{1}{2}}$ will exceed 3 miles by a very small quantity (about 79 feet.) If 12 feet – then

$$\sqrt{6} : 3 :: \sqrt{12} : 3\sqrt{2} : 4\tfrac{1}{4} \text{ miles};$$

therefore generally divide the height in feet by 6, extract the square root of the product, and three times the said root will be the distance of the horizon in miles.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1571.] SATURDAY, SEPTEMBER 17, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

SCHMITT'S PATENT IMPROVEMENTS IN CLEANSING AND SEPARATING ORES AND COAL.

Fig. 2.

Fig. 1.

SCHMITT'S PATENT IMPROVEMENTS IN CLEANSING AND SEPARATING ORES AND COAL.

(Patent dated March 8, 1853.)

The processes hitherto employed for separating ores and coal have been found unsuccessful, on account of the employment of water as an agent in such processes, whereby a degree of adhesion between the matters under treatment is produced which counteracts the effect of the differences of specific gravity in the ores, and size and weight in the coal. Mr. Schmitt proceeds, it will be seen, on an entirely different principle, and abandons altogether the use of water. His invention consists in first drying and sifting the ores or coal to be treated, and then separating the particles of the same according to their specific gravity or size and weight, by means of a blast of air transmitted from a blowing-machine through a blast-pipe in communication with suitably-arranged passages opening into vessels or chambers for the reception and classification of the substances to be acted on by the blast, the substances falling into such vessels or receptacles according to their specific gravity, or size and weight.

Figure 1 is a longitudinal section of the machinery employed in carrying the invention into effect. Q is a cylindrical blowing-machine connected with a blast-pipe, O, which conveys the blast through passages over a series of vessels or chambers, L, L, L, intended for the reception of the ore or coal, as hereafter explained. The pipe, O, is connected by a passage, P, with each series of vessels or chambers, L. Over each series of these vessels is a conical hopper, A, made of wood, or other suitable material, for feeding in the ore or coal to be separated. Each of these hoppers fits into a neck or funnel which opens into a passage, C D, of the same diameter as the passage, P, or of dimensions corresponding with the quantity of ore or coal to be fed into it at one time. This passage, C D, is fitted with two slides, *a b* and *c d*, placed one a certain distance above the other, by means of which a regular feed of the matters under treatment is maintained. These slides are made to open and shut by eccentrics keyed to an upright shaft, W, revolving in a step on a base plate, Y. The action of these slides is more particularly described hereafter. The passage, P, is inclined in an upward direction towards the vessels, L, as seen at X. I is a vessel or receiver placed under the passage, P, and provided at top with a valve, F, whereby communication is opened or shut off between the vessel, I, and the passage, P. This valve is opened or closed by a crank-arm and connecting-rod, by which it is connected to the shaft, W, previously mentioned. This vessel, I, is intended for the reception of the particles of ore or coal of greatest weight. K′ K′ are valves placed in the bottom of the vessel, I, to afford an exit for the contents of the vessel. The upper part of the passage, P, opens into the vessels or chambers, L L. K K are valves at the bottom of the chambers for discharging their contents. L is a passage above the vessels, L, leading through a pipe, M, into a chamber, N, into which the blast of air passes, carrying with it the dust or smallest particles of the substances under treatment, which it deposits in the chamber, N, and then blows off or escapes into the outer air. An apparatus for drying and sifting the ore or coal to be treated (previously to their being fed into the hopper) may be fixed over the hopper, A. The arrangements for feeding in the substances to be separated and for regulating the blast of air, are shown detached in section fig. 2; *g* and *q* are pipes for conveying the blast of air from the blowing-machine into a chamber, *r*, whence it passes through the opening, *t*, into the space or passage, P. The blast is regulated according to the ore or coal treated by means of the conical valve, *u*, which is moved by an eccentric on the shaft, W.

The operation of the machine is as follows:—The ores or coal to be treated are first well dried, and sifted in a drying apparatus, and are then introduced into the hopper or shoot, A; the upper slide, *a b*, is next opened, and the lower slide, *c d*, closed by their respective eccentrics, whereupon the charge in the hopper will fall into the space between these slides, and rest on the lower slide, *c d*; the upper slide now closes, and the lower opens, thereby precipitating the supply into the space, D. The conical valve, *u*, advances and diminishes the opening, *t*, to such an extent as to allow only such an amount of the blast to pass through as will lift up the particles of the charge, the heavy as well as light, and carry them up the passage, P, to a certain point, (represented by the line G H.)

The rate of blast requisite for effecting this can be ascertained by experiment, and depends on the specific gravity or nature of the substance under treatment. As soon as the substances have been carried so far, the conical valve *u* is drawn back, thereby widen-

ing the opening *t*, the lower slide, *c d*, closes, and the upper slide, *a b*, opens; while the valve F, leading into the vessel or receptacle I, opens also, and thus, while a fresh charge of matters to be treated falls through into the space between the two slides on to the lower slide, *c d*, the force of the blast has so far diminished, that the heavier particles of the first charge in the passage, P, fall through the mouth of the vessel I into that vessel. The force of the blast then drives forward the lighter particles of the charge in the passage P further along into the passage over the vessels L, and the particles drop into these vessels according to their specific gravities, or to their weight; the lightest particles of all being carried off into the chamber N, and there deposited, and the blast blowing off as before mentioned. The upper slide, *a b*, then closes again, the slide, *c d*, opens, and valve F closes, the conical valve *s* moves forward, and partially closes the opening *t*; a fresh charge falls through into the space D below the lower register, and the operation is repeated as before. In case of inattention it may occur that a small portion of the larger particles may fall into the vessels intended for the lighter, and *vice versâ*. In such cases the preceding process should be recommenced, and then, by slight modifications in the pressure of the blast, the separation may be carried to a great degree of nicety. Of course the point to which the operation should be carried will be determined by the nature of the substance treated. Thus with ores of gold, silver, cobalt, and nickel, the separation might be carried to a nicer extent than with coal.

AERIAL TRAVELLING.

To the Editor of the Mechanics' Magazine.

SIR,—An unfortunate sentence of mine in the letter you were kind enough to insert on Aërial Travelling, has shown that Mr. Nye is not the only gentleman who has discovered *the* aërial machine.

"G. B., of Hoxton," very obligingly wishes to correct the press for me, when I venture to question the possibility of constructing an aërial sailing-machine; and Mr. Baddeley declares me to be, "manifestly incapable of distinguishing between the possible and the impossible." That this may not be a mere contest of words, as it threatens to be, allow me, Sir, to state more distinctly what I really did mean in the sentence referred to.

I assert, that whereas a vessel propelled by sails through the water can, with sufficient sea-room, convert *any* wind into the means of propulsion in the direction of its required course; a vessel propelled by sails through the air *only*, cannot so convert any wind into the means of propulsion, but is compelled to travel in the *direction* of the wind: and since the possibility of such conversion is the fundamental fact of Navigation, I do assert that no analogy exists between *sailing* in the air, and *in*, or rather *through* the water.

Again; since in sailing through the water the vessel has in its own direction a velocity greater than that of the water, it is able to convert the force arising from this relative velocity of the fluid traversed into a guiding force, by means of the rudder: but in sailing through the air no such relative velocity can possibly be obtained, and a rudder is absolutely useless. And further, although "sufficient has been done to prove beyond all question that propellers will act upon a balloon," yet no balloon has, to my knowledge, ever been constructed in which the propelling-force bore such a relation to the rapidly-increasing resistance upon it as to give "steerage-way;" and I intended to assert, that by most practical and scientific men, it was believed to be as unlikely that such a velocity could be given to a propeller as to overcome the resistance to the necessarily huge balloon, and to render steering, in any general sense, possible, as that we shall ever discover the means of renewing the sources of animal existence, or of counteracting those forces which prevent machines of human construction from demonstrating the truth of the first law of motion.

I quote Mr. Baddeley himself, in support of the proposition. He refers me to a letter in the *Mechanics' Magazine* of 1836—written by himself, it appears—"in which," he informs us, "experiment and common sense certainly take a different view of the question." In the said letter he announces the discovery of "a means of propelling balloons in *any* direction"—*that* seems to settle the question, at all events: but at the end of the letter, he says, "I should wish no person to suppose for one moment that balloons will ever be guided in the teeth of opposing currents." I am sure I do not know what he means here; for if the balloon is propelled at all, it must *create* an opposing current: this, however, *is* clear; that if he is right, no solution of the problem—how to steer a balloon—is possible, the word steer being used in anything like the extended sense it has when applied to navigation. And further, it does not appear that any *experiments*

had then been made by Mr. Baddeley: if he has made any since, their success has not been notorious; and he must pardon my stating my conviction that, with a balloon, it never will be. What would Mr. Nye say to this last quotation from his brother aëronaut? He would possibly, if not too gentlemanly to descend to personalities, declare him to be "incapable of judging between the possible and impossible," for it will be remembered that he imagined himself to have demonstrated the possibility of stemming a current at the rate of 15 miles per hour! Here would have been steering with a vengeance!

That I do not despair of being able to steer aërial machines, is clear from my concluding remarks on Mr. Nye's invention: it is with balloons only that I anticipate continual failure — an anticipation shown not to be altogether groundless by the evident impracticability of Mr. Nye's scheme, in spite of his enormous propelling power.

To "G. B." I would just say that he has totally mistaken the question: it is not at all of the analogy between *propulsion* in the air and in the water; but of *sailing* in those two elements: if his objection is to this, I must recommend him to get a block of wood of about the same specific gravity as water; put it in a side-way, and then endeavour to cause it to go across or against the stream, by altering its shape in all conceivable ways: if he should succeed, he will have done something towards disproving my assertion and immortalising himself. Mr. Baddeley has not succeeded in expressing the first part of his letter with sufficient clearness to make me understand whether he, too, has not mistaken the question. I will not, however, suppose him to have done so, but can only say that I most heartily wish the Society at Kew, or some other association possessing the real source of power—money—would enable such men as Mr. Nye and himself to demonstrate practically the truth or falsity of the notions by which they believe themselves to have obtained the solution of the problem of aërial navigation. Before this is done, Mr. Baddeley must of course be pardoned for indulging in the pleasing dream, that he has solved it; and I have neither the means nor the desire to disabuse his mind of the conviction.

In the commencement of my letter of August the 22nd, I said, what I see no just cause for contradicting, that "a belief in the probability of aërial navigation seems to vary *inversely* with the extent of one's mechanical knowledge." Considering the definite character of the problem to be solved, its admitted importance, and the numerous experiments that have been made during the last half century, it is certainly a most ominous fact that no known scientific men have devoted, or are devoting their attention to it. When we get a new motive power of greater condensed energy than steam, requiring less cumbrous apparatus for generating it, then, discarding the balloon, we may hope to carry out worthily the suggestion of Mr. Nye, and to discover at the same time the means of propelling and steering aërial machines.

I am, Sir, yours, &c.,

N. B.

Sheerness, Sept. 12, 1853.

AERIAL NAVIGATION.

To the Editor of the Mechanics' Magazine.

SIR,—It is a long time since I intruded on the notice of your readers, but I cannot see what I consider erroneous notions set forth in such language as might mislead the unthinking; and thereby cause a wasteful expenditure on such a phantasm as aërial navigation. (I have only seen what has appeared in your pages.)

To save trouble and space, I will take the 187 feet diameter (see p. 167) as all sufficient, leaving out all appendages,—such as propelling power, stageing for ditto, passenger car, &c. &c.; and then, as a balloon travels at the same velocity as the wind, we shall find it requires from 1 to 1½ horse power to hold it stationary against a pleasant summer breeze; and should the wind increase to the ordinary speed of our fast railway trains, it would then require from 7 to 10 horses power; and all this, not to produce any forward motion but merely to keep it stationary in the wind's eye; and in a hurricane the requisite power would be from 20 to 30 horses to produce the same, or I ought to say no useful effect, as the whole of the power must be expended in counteracting the force of the wind.

Now when we consider that to travel against the wind with a velocity equal to it, it would in each case require four times the power above stated, every one must see the utter hopelessness of the scheme; and if we merely glance at the necessary appendages the thing becomes at once an absurdity as they must of necessity so much increase the surface exposed to the action of the wind, and consequently the power required.

I am, Sir, yours, &c.,

T. V

Sept. 8, 1853.

BARTON'S PATENT PORTABLE BATH

WE gave a brief description of Mr. Bar-

ton's Bath in Number 1568, page 176, among our weekly abstracts of specifications of patents recently filed. As the invention has already received considerable public favour we now give the accompanying engravings, in order to furnish a more detailed description of it than that previously given; which must be referred to however, as a completion of the following explanations:

Fig. 1 of the engravings annexed is a side view, and fig. 2 a plan of this bath in a complete state, and ready for use. A A^1 A^1 is the head of the framing, which serves also to contain the bath when folded

Fig. 1.

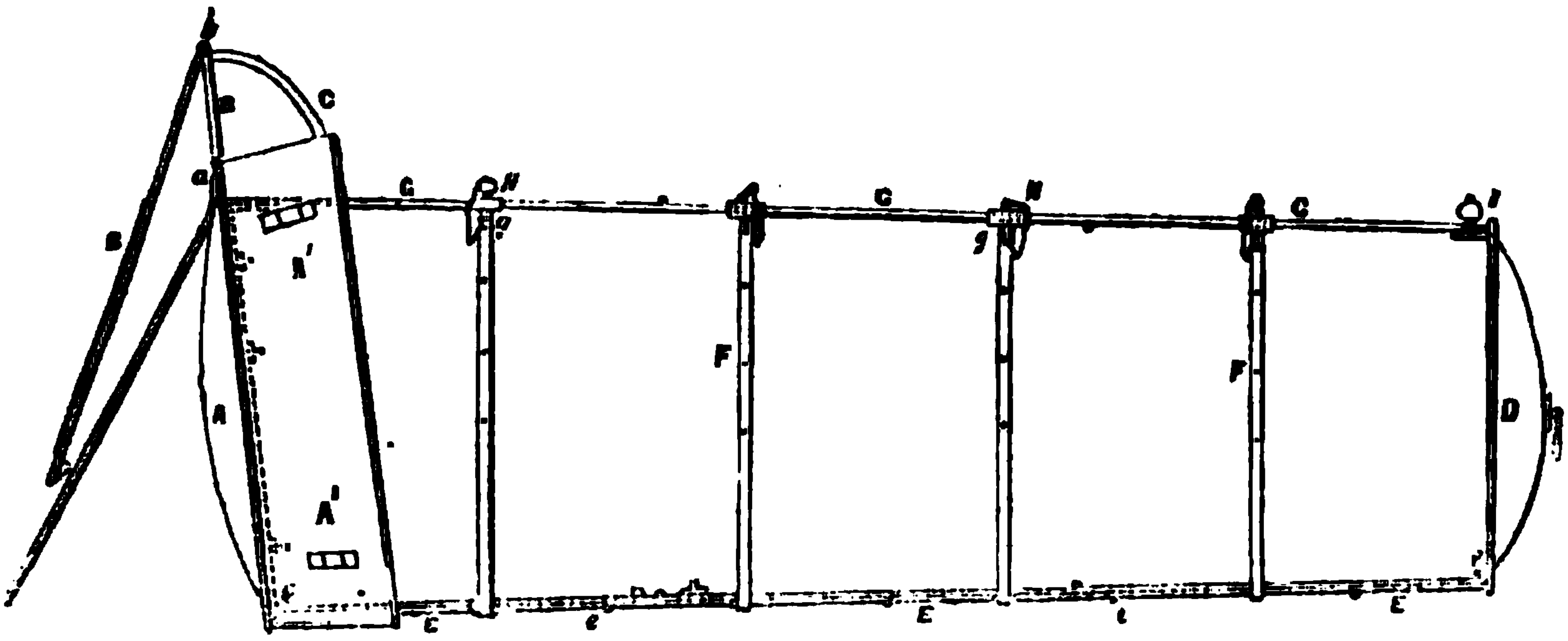
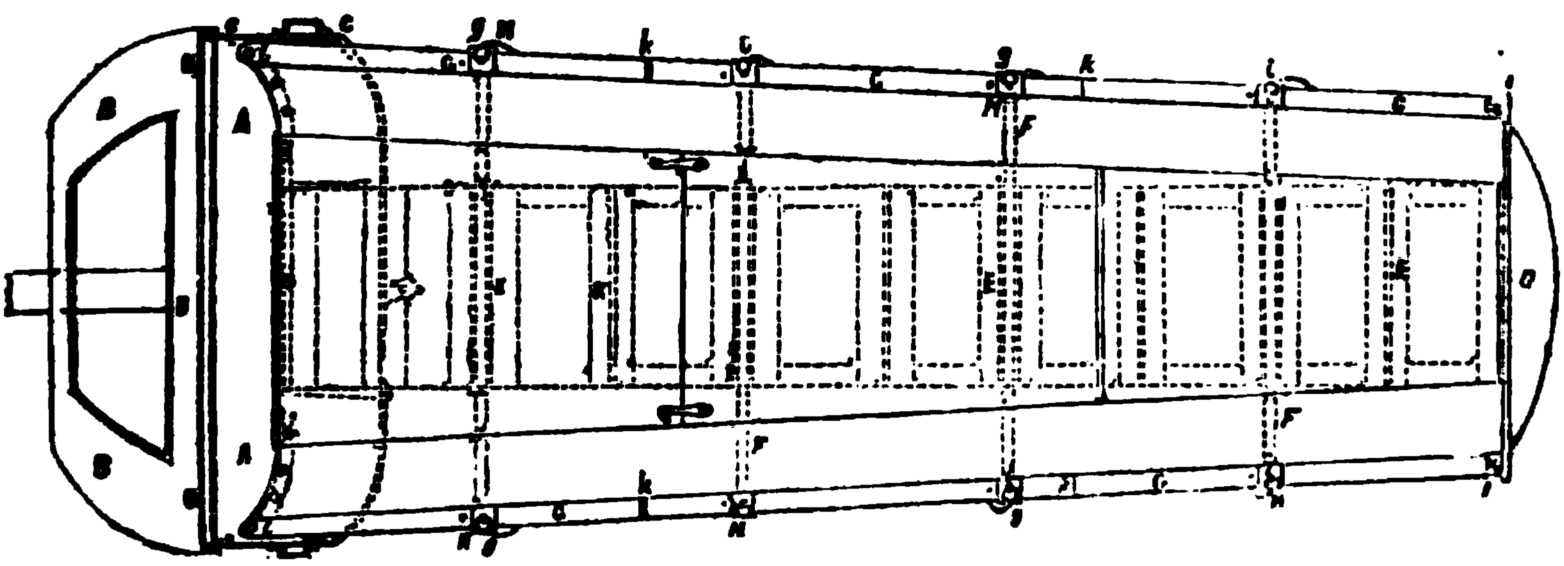


Fig. 2.



B B^1 is the cover to secure the parts within the head, the part B is hinged to the upper edge of the back-plate A, of the head at *a*, and B^1 is hinged to B at *b*. C C are quadrants attached at each side of B, and working into guides, *c c*, in the side-pieces, A^1 A^1 of the head, for the purpose of preventing the part B from being thrown back too far, and keeping it steady whilst being raised. D is the foot-plate, composed of sheet-metal, and connected to the head-plate, A, by the metal-frames, E E, which are hinged to each other, and to the bottom part of the head and foot-plates A and D at *e e*; F F are transverse ribs or stretchers extending upwards from the bottom frames, E E, on each side, and attached to the bottom frames, G G, are longitudinal stretchers extending on each side from the head to the foot-plate, and fitting into clips, *g g*, formed in the upper part of the transverse ribs, where they are held fast by pins, H H, which pass through holes, *i i*, in the clips and through the metal of the stretchers, G G. These are composed of three or more lengths hinged to each other at *k k*, and to the head-plate A, at *l*, in order that they may be folded, so as to come within the casing, A A^1, when the baths is packed away. I I are thumb-screws, by which the ends of the longitudinal stretchers are secured to the bottom plates, and by unscrewing which those ends are released when the bath is to be folded. The lining of vulcanized India-rubber or other suitable water-proof material is fixed inside the frame by rivets, screws, or other fastenings passing through the transverse ribs, F F. At the head it is secured by a flat rib, which is screwed or riveted to the side-pieces, A^1 A^1, so as to compress the edges of the lining tightly against these parts, and at the foot by a similar rib or plate, which is riveted or screwed to the edges of the foot-plate, D; it is further strengthened by being attached at its upper edges to a band or cord, by which the transverse ribs on each side are connected together. K K are plates of metal hinged

to each other, and to the lower part of the head-piece, A, at *m m*, so as to be capable of being folded, and which, when extended, are laid along the bottom of the bath, inside the lining, for the purpose of protecting it when in use, and giving greater rigidity to the apparatus. L is an aperture in the foot-plate, which is provided with a stopper or tap, for the escape of the used water.

SIR W. R. HAMILTON'S "QUATERNIONS."

(*Continued from page* 213.)

We have given some account of the requirements of a system of Quaternions, let us now see how the inventor constructs his theory to satisfy these. New definitions have to be given of, and new meanings are to be assigned to the symbols, —, +, ÷, ×, to adapt them to the peculiar operations known in this theory by the names of subtraction, addition, division, and multiplication. In a former part of our notice of this work we endeavoured to establish the fact, "that the pure sciences are really reducible to very small dimensions, and to very narrow limits." We accordingly think that somewhat less than *two hundred and fifty pages* might have sufficed to explain, fully and accurately, the significations attached by Sir William Hamilton to the four symbols before referred to, even after every allowance has been made for their novelty and peculiarities. Indeed, we consider this prolixity as absolutely inconsistent with the requirements of philosophy. The only consideration that renders it tolerable, is that the lectures were primarily written for delivery at the College, and not for publication. It would have been more prudent on the part of their author, however, to have suitably altered their form before sending them to the press. As they appear here they are too lengthy, too vague, too complicated. The very definitions seem susceptible of an almost endless variety of interpretations, and the expositions which follow appear to be only selections of such of these as are required for present use, the rest being reserved till future occasions call for them. We should be glad to give many of these in the author's own words, we must however limit our extracts and endeavour to supply more briefly what account of them we can. "I wish to be allowed to say," says the author, "in general terms (though conscious that they will need to be afterwards particularized), that I regard the two connected, but contrasted marks or signs,

$$+ \text{ and } -$$

as being respectively and primarily characteristic of the synthesis and analysis of a state of progression according as devised from or compared with some other state of progression." This is the general definition of the above signs, intended to embrace their significations in all applications of algebra. The next step is to reduce this to geometry; "Let space be now regarded as the field of the progression which is to be studied, and points as the states of that progression." And hence the sign (—) is regarded as the "characteristic of the analysis of one geometrical position (in space) as compared with another (such) position." Accordingly the expression

$$B - A$$

where B and A stand for the positions of two points in space, is brought to mean "B analysed with respect to A, as regards difference of geometrical positions;" but is more commonly read, as sufficiently exact, B minus A. The only analogy between this and the common signification of this symbol is, that between the expression, "The difference of the distances of the points A and B from some other known point," and this "the difference of the positions of the points A and B." It would certainly be better to use some new symbol here than to preserve the old sign with a new meaning. But the difficulty is how to do this, and yet preserve the form of operations analogous to that of common algebra. The phrase "point minus point" not only sounds absurd, but is essentially so, for the word minus necessarily refers to differences of magnitudes of the same kind. No one has a right to object to the use of a symbol to represent in a contracted form any verbal expression whatever, if it serve to economize labour and to present the idea in a readier and clearer manner; but to press the word minus into such a use as that indicated seems unwarrantable, however convenient it may be to the author,—who, however, thinks there is a precedent for this illtreatment of the sign (—) to be found in the use, which is made of it in common formulæ. "It is well known to every student of the elements of algebra," says he "that the word minus, and the sign (—), are, in those elements also, used, very frequently, to denote an operation, which is by no means identical with taking away a partial from a total magnitude, so as to find the remaining part: thus every algebraist is familiar with such results as this, that (negative four) minus (positive three) equals (negative seven): where if mere magnitudes or quantities were attended to, and the adjectives, Positive and Negative, dropped, or neglected,

and not replaced by any other equivalent words or marks, the resulting number seven would represent the (arithmetical) sum and not the (arithmetical) difference, of the given numbers, 'four and three.' But what is there in this to decrease our dislike to the subtraction of one point from another? We are at a loss to account for the introduction of such an illustration in defence of the author's inappropriate nomenclature.

However, we will take symbols

$$B - A$$

as expressing the difference of the positions of the points B and A, and as furnishing us with the information needful to the discovery of the position of B from the knowledge of that of A, and we shall presently see the purpose it serves in the addition and subtraction of lines. Regarding it, then, as a step by which we go from the point A to the point B, let us denote this step or transition by the letter (a), so that we may write

$$B-A=a$$

This a our author calls a "vector;" hence starting from the point A, and using vector (a) we get the point B. This synthetical process is indicated by the sign + being inserted between a and A, in this form, $a+A$, and then equation denoting this process, is

$$B=a+A.$$

Here we arrive at the first introduction of the operation of addition. This equation is interpreted as meaning that "the position denoted by B may be reached (and, in that sense, constructed), by making the step denoted by a from the position denoted by A." The expression $a+A$ will therefore represent the point B; and repeating this operation by adding another vector in the same manner, we pass to the point C, and denoting the vector C—B by b, we have

$$C=b+B,$$
$$C=b+a+A.$$

But there is a single step,

$$C-A=c,$$

by which we may proceed to the point C from A, so that

$$C=c+A$$
$$\therefore\ c+A=a+b+A.$$

That is the same position is obtained, whether you pass at once from the point A to C, or proceed first from A to B, and then from B to C. And lines are regarded only as to the positions in which they terminate. Addition of lines, therefore, comes to mean their composition, the sum of two or more being the single line or step which would reach to the same point as that to which the lines to be added reach when used one after the other as steps. This is the object of the peculiar meanings attached to geometrical addition and subtraction; for without this we could not represent a line joining the origin with a point $x\ y\ z$ by the expression

$$i\,x+j\,y+k\,z,$$

as the theory requires.

That these operations have any claim to the names bestowed on them does not readily appear. They seem to have *no right at all* to them, except when the lines said to be added or subtracted are in the same direction, and even then very little.

Here are some peculiarities, to which there is nothing analogous in common addition and subtraction. Ordinarily whatever things can be subtracted can also be added, and *vice versâ*: not so here. We may have a difference of two points, but we cannot have their sum. We may have the sum of a point and a line, but we cannot have their difference. Indeed the addition of two lines is a departure from the original meaning of the operation.

The difficulties involved in all this are not at all lessened by the introduction of a cumbrous nomenclature, however imposing its appearance may be. We are not at all assisted by calling the point A a "*Vehend,*" the point B a "*Vectum,*" and the line (B—A) a "Vector." Then B a "Provehend," C a "Provectum," &c. These terms are used when the point C is reached *viâ* the point B; but then C may be arrived at by a direct route; in relation to this journey, A is called a "*Transvehend,*" and so on. The principles to which all this is intended to conduct, we think, might more conveniently to the reader of these lectures have been stated at first. They seem to be as follows:—The principle of addition is, that one set of lines is regarded as equal to another set, when they reach from the same initial point to the same final point,—each being equal therefore to the line which joins the initial with the final point. Connected with this is the following principle of subtraction. The difference of two sets of lines reaching from the same initial point to different final positions, is regarded as the difference of the points in which they terminate. The construction of a notation subservient to these occupies the first Lecture.

In the second Lecture the meanings of the symbols $\div$, $\times$, are set forth, the sign $\div$ being taken first of the two just as the sign — was taken the first of the two —, +. Much the same method is used in the pro-

cess. The first or primary definition of the sign $\div$ is contained in the following:—"As we before (analytically) compared a point B, with a point A, with a view to discover the ordinal relation in space of the one point to the other, so we shall now go on to compare one *directed line*, or *vector*, or ray, β, *with another ray*, a, to discover what I shall venture to call *the cardinal relation of the one ray to the other*, namely, (as will soon be more clearly seen), *a certain complex relation of length and direction.*" We need not say that this definition of division is vague, as everybody can see the fact for themselves. But the author goes on to make it "more clearly seen." We, however, have not space to follow him. Suffice it to say, that the symbolical expression

$$\beta \div a$$

denotes a complex relation of two co-initial rays including relative direction as well as relative length. And this of course furnishes us with the means of constructing the ray, β, from a knowledge of the ray, a; and this synthetical process is denoted by the sign $(\times)$ in such a manner, that we may write

$$a \times (\beta \div a) = \beta.$$

In the lectures this is called an act of "Faction," a a "Faciend," $\beta \div a$ a "Factor," β a "Factum," and so forth through variations with *pro*, and *trans*, prefixed.

Multiplication is here, therefore, the passing from one line to another, the "factor" or instrument of this passage being expressed by the symbol

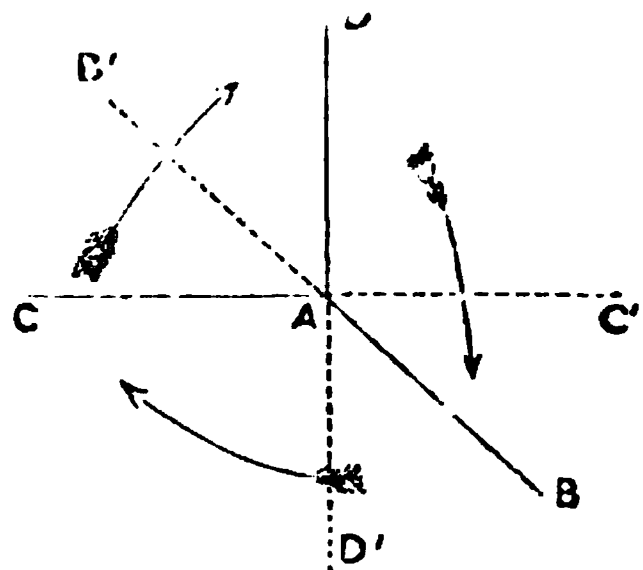
$$\beta \div a.$$

When both these lines are in the same or opposite directions, the above relation will be expressed by a simple positive or negative number. The operation of multiplication will become so like that of common algebra, that we shall not notice it here, but shall pass to what the author calls multiplication of lines; not pretending, however, to understand what the process of multiplication already defined has to do with the action of one line upon another.

Meanwhile it is of primary necessity to assign some meaning (comprehensible or other) to the symbols i^2, j^2, k^2, ij, ji, &c., as they occur in a quaternion. The mode in which this is done is by no means admirable, on the contrary, it really appears like an attempt to confuse the reader. The author uses two systems of symbols to denote the same three rectangular co-ordinate axes, and interchanges these in such a way as to cause one almost to suspect that it is desired he should mistake one for the other, and so be unprepared to contradict any proposition that may be advanced as a truth, though it certainly does not incline him to assent to it. But here is some account of the process.

Let B A B′, C A C, D A D′, be three

Fig. 3.



straight lines in space at right angles to one another, having a common point at A; and moreover, suppose A B, A B′, A C, A C′, A D, A D′, to be all of the same length.

Let i be a factor which, acting on any line in the plane C D, C′ D′, shall have the effect of turning it through a right angle, in the direction of the arrow. Let j and k be similar factors acting in the planes D B, D′ B′, and B C, B′ C′ respectively. Then,

$$AC \times i = AD$$
$$AD \times j = AB$$

hence $\quad AC \times i \times j = AB;$

again $\quad AC \times (-k) = AB$

$$\therefore AC \times i \times j = AC \times (-k)$$

hence $i \times j$ has the same effect on AC as $(-k)$. So if we write ij to indicate the operation indicated by i, followed by that indicated by j, we may say, then,

$$ij = -k$$

We may remark here, that the opposite lines A C, A C′ are the only ones in the system capable of this combination of operations, and similarly the lines AB, AB′ are alone capable of the operation of the compound symbol ji, that is, the operation or "faction" represented by j, followed by that of i.

To discover, therefore, the effect of this last we will begin with the line AB.

$$\text{now } AB \times j = AD'$$
$$AD' \times i = AC$$
$$\therefore AB \times j \times i = AC$$
$$\text{but } AC = AB \times k$$
$$\text{substituting } AB \times j \times i = AB \times k$$

or the effect of ji on AB is the same as that of k. Hence we have

$$j \times i = k$$

contrasting this with the before obtained result, we obtain the equation

$$ji = -ij.$$

This will of course not be startling when the nature of the symbols $i\,j$ is taken into consideration. For they are such that the equation

$$-j\,i=(-i)(-j)$$

is manifestly true, and that

$$(-i)(-j)=i\,j$$

is so too, so that from these also we have

$$j\,i=-i\,j$$

This is, however, of no practical value in Quaternions because the only line which can be the result of the operation $j\,i$ lies in the direction AC or AC′, while that which alone can be the result of the operation $i\,j$ lies in the direction AB or AB′. An expression therefore involving $j\,i$ and $i\,j$, such as

$$i\,j\,b\,z+j\,i\,c\,y$$

would represent two lines at right angles, and could not therefore be resolved into this

$$i\,j(b\,z-c\,y)$$

as the theory of Quaternions requires that it should. That we may do this it is of course needful that $i\,j\,b\,z$ should be a line opposite in direction to $j\,i\,c\,y$. To satisfy this condition the symbols $i\,j\,k$ are invested with a double office; each is made to denote a straight line whose length is the unit employed, and at the same time an act of faction in a plane perpendicular to it. Thus i will represent the line A B, and will act as a "quadrantal versor" in the plane C D C^{1}D^1; j will represent A C, &c., and k will denote A D, &c. Here of oourse the expressions $i\,j$, $j\,i$ entirely alter their character, no longer being the symbols for a combination of rotations, but the first being a single rotation of i about j, and the second the like rotation of j about i quadrantal in each case. This is *called* multiplication of lines! And it is upon this the whole theory of Quaternions is founded!

But allowing this process of multiplication of lines to be thus interpreted, there are still reasons why, as a foundation for the present theory, it must be regarded as a complete failure. For if $j\times i$ means the line represented by j, acted on by an operation represented by i, then what ought $i\times i$ to mean? Why, certainly, the line denoted by i acted on by the operation denoted by the same symbol. That is the line i turned round itself through a right angle. Hence *we* should conclude, if it has any meaning at all, that $i^2=i$ in this case; and this is the form in which it appears in a Quaternion. But here Sir W. Hamilton writes the equation $i^2=-1$!

This formula is, of course, drawn from the consideration, that the operation denoted by i, when performed twice on the line denoted by j or k, has the same effect as the operation of -1. And yet, in this way, i^2 does not appear at all in a Quaternion. The equation $i^2=-1$ has, therefore, no right whatever to be used in it.

(*To be continued.*)

SPECIFICATIONS OF PATENTS RECENTLY FILED.

Joseph Sparkes Hall, of Regent-street, Middlesex, boot-maker. *Improvements in cutting out parts of boots and shoes.* Patent dated March 4, 1853. (No. 547).

A description of this invention was given in our last Number.

Henry M'Evoy, of Birmingham, Warwick. *Improvements in covered buttons.* Patent dated March 4, 1853. (No. 550.)

Claim.—A method of applying cord in forming the shanks of covered buttons, in which the cord is passed through the back covering and the substance forming the body of the button, whereby great strength is obtained, and a flatter and more compact button is produced.

James Boydell, of the Anchor Works, Smethwick, near Birmingham. *Improvements in the construction of bedsteads.* Patent dated March 4, 1853. (No. 552.)

This invention consists in employing metal rolled, or otherwise formed into a trough-like shape, in the construction of the side and end rails of bedsteads, by which means the sacking may be better connected with the rails than ordinarily.

Mary Ann Smith, of Wimpole-street, Marylebone, Middlesex. *Improvements in the manufacture of toys, models, and other like articles of ornament or utility.* Patent dated March 5, 1853. (No. 554.)

In forming the articles named in the title Mrs. Smith employs bonnet wire, covered with thread or silk, as a framework, and thin wood, tinfoil, or pasteboard, for the broad surfaces. The wire framing is covered with a composition formed of whitening mixed with glue or size, such as is ordinarily employed by carvers and gilders.

Claim.—"The employing of wire, with or without pasteboard or thin wood, covered with any thickening adhesive composition, when wire forms the skeleton or principal framework of toys, models, and other like articles of ornament or utility, as described."

John Gedge, of Wellington-street, Strand, Middlesex. *Improvements in the construction of fire-arms, and in the means of*

loading the same. (A communication.) Patent dated March 5, 1853. (No. 555.)

Claims.—1. A plate of a certain form, the object of which is to cover the works of the lock before it is placed in the stock, in order to preserve the said works from becoming foul.

2. An improved slide or plunger having one, two, or more grooves cut in it, for the purpose of more readily allowing the escape of the gaseous or foul air caused by the combustion or explosion of the cartridge in firing firearms.

BALDWIN FULFORD WEATHERDON, of Chancery-lane, and CHARLES DEALTRY, of Anneville-house, Guernsey. *Improvements in the construction of certain floating vessels, and in the mode of propelling them.* Patent dated March 5, 1853. (No. 556.)

These improvements relate; *first*, to a mode of constructing certain floating vessels, which has for its object the giving to mail and passenger-vessels a speed upon the water approaching to that which is obtained upon railways. The patentees propose to construct marine carriages with a series of buoyant wheels or drums firmly keyed upon suitable shafts, and supported by strong framework attached to each side of the carriage. These wheels are intended to support the hull "entirely out of the water, with the exception of a deep narrow keel, to which will be attached the rudder or rudders to steer with, and which will at the same time act as a leeboard, and prevent drifting to leeward." Should it, however, be deemed advisable in boisterous weather to sink the vessel partially into the sea, and thus to offer less resistance to the wind, provision is made to take in water ballast, and discharge it when necessary, with a small amount of labour, so that the vessel is made to sink to the required depth, and to rise again when the weather has moderated. The wheels are to be built in compartments, to prevent any accident occurring from a leak. There is also to be an internal pressure of air maintained within each wheel, equal to seven pounds upon the square inch, by means of a pump forcing air into each compartment thereof through an opening in the shaft, so that any water which has passed into the interior will be forced out through the valves without diminishing the density of the internal air, and causing the wheel to collapse, which would be dangerous. "The smallest-sized paddle-wheels with which the vessel should be constructed would be 16 feet in diameter, and so made as to displace 14 tons of water each, at 3 feet 6 inches draught. When laden with the above weight, the weight of each wheel, with its appendages, would be about 4 tons, consequently each wheel would be capable of sustaining a burthen of 10 tons in addition to its own weight,"

The improvements relate; *secondly*, to a mode of propelling floating vessels, and consist of a certain construction of screw-shafting for vessels propelled by a screw, and "a method of forming the keels of such vessels for securing the screw-shafting."

Claims.—1. The construction of buoyant marine carriages, in which an arrangement of light air-tight cylinders or air-chambers is employed for supporting and giving motion to the body of the carriage or vessel.

2. A mode or modes of constructing the said cylinders without air-tight compartments.

THOMAS WELLS CROSS, of Hunslet, Leeds, York. *A portable fire-engine.* Patent dated March 5, 1853. (No. 557.)

The object of the inventor is to "construct in a portable shape, and at about half the expense of ordinary fire-engines, an engine that will perform as much work as an ordinary engine with less labour."

Claims.—1. The general arrangement of parts described.

2. The use of a screw-lever, or lift-valve, instead of a cock, as in the ordinary fire-engine, and also of a perforated mouth or opening attached to the same.

3. The right of mounting a fire-engine in a plane, shallow, oblong box, open at the top, and arranged to hold all the machinery and apparatus connected with a powerful fire-engine, including buckets, hose, ladder, &c.

WILLIAM TODD, of Rochdale, Lancaster, engineer. *Improvements in steam-engines.* Patent dated March 5, 1853. (No. 558.)

These improvements relate; *firstly*, to a method of communicating the motion of the governor to the throttle-valve or other apparatus used for regulating the flow of steam into the cylinder of the engine, and consist in the employment of a wheel or wheels, or other rotary surface or surfaces as the connecting part or parts, instead of the system of levers usually employed; and *secondly*, to a method of causing the action of the governor to operate upon a valve, "so as to admit air to the vacuum side of low-pressure engines, for the purpose of arresting the motion of the same when an excessive velocity has been attained," in which method the rotary surface or surfaces before mentioned are employed.

Claims.—1. "The employment of rotatory apparatus between that usually employed in connection with the governor and the throttle-valve, for the purpose of opening or closing the said valve."

2. "The combination of such rotatory apparatus with a valve opening to the condenser, for the purpose above set forth."

RICHARD ARCHIBALD BROOMAN, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agents. *Improvements in machinery for making pipes and tubes.* (Communication.) Patent dated March 5, 1853. (No. 560.)

This invention consists of an improved machine or tool for making metal pipes without seam or joint.

Claims.—1. "The construction of a roller-die for making pipes without seams, to be operated in a manner similar to the dead-die."

2. "The arrangement of the rollers within a box, so that they shall be directed radially toward the centre and be made to revolve by the passing of the metal through them, producing an equal pressure tending on all sides to the said centre as described."

3. "Ornamenting the edges of the rollers for producing impressions or ornamental figures upon the metal.

RICHARD BARTER, of Saint Ann's Hill, Blarney, Cork, M.D. *Improvements in cutting roots and other vegetable substances.* Patent dated March 7, 1853. (No. 562.)

The machine described by Mr. Barter consists of a circular disc or drum, "or two discs united by cross-pieces with a drum or driving-wheel between them, suitably mounted in a frame and having an operating surface of suitably-formed knives or cutters on each side of the said disc, or on the outer sides of the pair of discs. The discs are placed between two hoppers and made to revolve. The inventor claims the above arrangement of apparatus.

WILLIAM BARRINGTON, of Mallow, Cork, civil engineer. *Improvements in life-boats.* Patent dated March 7, 1853. (No. 563.)

Claims.—1. The unequal distribution of buoyant chambers, or materials by means of which the boat shall right herself after being upset.

2. Certain self-acting valves and their appurtenances, by means of which the water is discharged from the inside of the boat.

JACQUES FRANCOIS DUPONT DE BUSSAC, of Royal Avenue Terrace, King's-road, Chelsea, Middlesex. *Certain improvements in paving and covering places.* Patent dated March 7, 1853. (No. 567.)

The inventor, by means of a rolling-mill, impresses parallel and equal grooves on both sides of iron sheets, and then fills the grooves with a cement formed of powdered iron ore, carbonate of lime or asphalte, and "pitch or gas tar in fusion." The road to be paved is then levelled with a pressing-roller, and covered with a layer of melted cement, upon which the sheets are placed and then forced down with rollers. Cast-iron grates may be used instead of the grooved plates.

In paving footways or private places, the thin corrugated sheets may be dispensed with, their place being supplied by coarse and cheap cloths impregnated with melted tar, pitch, or bitumen, and then covered with the cement above described.

Claims.—1. "The forms of iron as specified, or others substantially the same, for the purposes herein described."

2. "The use of the cement described, either alone or combined with the forms of iron, for the purposes herein specified."

3. "The use of cement combined with cloths, as described."

GODFREY SIMON, and THOMAS HUMPHREYS, of Pennsylvania, United States. *Improvements in carriages.* Patent dated March 7, 1853. (No. 568.)

The *first* part of this invention consists in constructing open carriages with moveable seats, so that the sitters may at choice either face each other, or all face the horse. The *second* part refers to a mechanical arrangement by which the head of the carriage may either be raised or lowered from the inside. The *third* part relates to a new mode of suspending the body of the carriage and of connecting it to the axletrees, and also to a new mode of connecting the perch to the front axle-tree, thereby dispensing with the turn-plates hitherto employed in the construction of four-wheeled cariages. And in the *fourth* place, it consists in employing hickory instead of ash or lance-wood, as a lighter, cheaper, and more durable wood.

WILLIAM MATTHEWS, of St. James's-street, Nottingham. *Improvements in piano-fortes.* Patent dated March 7, 1853. (No. 569.)

The *first* part of this invention consists in substituting thin rods of brass or other suitable metal in lieu of the wood-stickers hitherto employed in upright piano-fortes. The *second* part consists in replacing the hopper action made use of in such instruments by a mechanical operation, denominated a propelling action. The *third* part consists in placing the dampers underneath the hammer, and in so constructing the said dampers as to cause them to approach the vibrating strings steadily in an oblique direction, "and thereby to cause them positively but silently to cease their vibrations quickly." The *fourth* part consists in applying to upright pianofortes additional sets of hammers (formed of different degrees of hardness, for the purpose of producing different tones,) without increasing the size of the instrument; and further, in employing a series of steel vibrators in combination

with the said hammers, for the purpose of obtaining additional as well as different tones. And the *last* part consists in forming the supporting parts of the frame of pianofortes of angular-shaped bars of iron or brass, instead of wood, as hitherto practised.

JOSEPH JOHN WILLIAM WATSON, of Old Kent-road, Surrey. *Improvements in illuminating apparatus, and in the production of light.* Patent dated March 7, 1853. (No. 570.)

Claims.—1. The application of the mixed gases, oxygen and hydrogen, obtained from the decomposition of water by galvanic or other agency, to the purposes of illumination, by causing them to impinge during their ignition against "certain non-combustible or nearly non-combustible radiating mediums, as lime, the earths, graphite, spongy platina, &c., or certain compositions described by the inventor.

2. Increasing the light from the radiating body by surrounding it with a coil of fine platina wire.

3. Producing coloured light by directing a stream of hydrogen gas, or of a mixture of oxygen and hydrogen gas on to spongy platina, treated as described.

4. A certain described arrangement of illuminating apparatus.

5. The application of a metallic safety float, which in the event of the water in the gas-generating chamber falling too low, establishes a metallic connection between the decomposing plates, and thus arrests the decomposition.

6. "The application of apparatus moved by clock-work, to impart a rotary, reciprocating, and advancing motion to the radiating body on which the flame impinges, in lamps of any construction, for the burning of hydrogen or oxyhydrogen gas, from whatever source obtained."

THOMAS WEATHERBURN DODDS, of Holmes Engine and Railway-works, Rotherham, York, engineer. *Improvements in the treatment and manufacture of iron and steel.* Patent dated March 7, 1853. (No. 571.)

Claims.—1. A general arrangement of machinery.

2. The conversion of iron into steel, wholly or partially, by the use of a carbonaceous fuel, or a mixture of soda-ash, soda, potash, pearlash, or other alkaline matter, and carbonate or bi-carbonate of lime and charcoal.

3. The mode of converting iron, wholly or partially, into steel, by the use of a compound of soda-ash, lime, and charcoal, or any mixture of alkaline matter with carbonate or bi-carbonate of lime and charcoal.

4. "The mode of treating iron, or partially or wholly converted metal, by plunging it when red-hot or thereabouts into a wet or dry bath; that is, either into water, water impregnated with carbonaceous matter, liquid ammonia, or ammoniacal liquor, a solution of potash, or hydrate of potash, or into a mass of dry carbonaceous material, as highly-carbonized sand charcoal and soda-ash, or other carbonaceous matter."

5. "The mode of arranging and working the furnaces of conversion, wherein the retorts or converting-chambers may be charged and discharged whilst they are in working condition, without being permitted to cool."

6. The mode of adjusting the anvil level of steam hammers by means of a hydrostatic cylinder or chamber.

7. The mode of working hammer or tilt-levers, so as to strike in both directions by the use of a rotary crank-shaft connected therewith.

8. "The use of an atmospheric buffer for increasing the rapidity of the hammer strokes."

9. "The use of cork or other partially elastic material at the points of metallic connection of hammer details" for the purposes described.

CHARLES PARKER, of Dundee, Forfar, North Britain, manufacturer. *Improvements in weaving.* Patent dated March 7, 1853. (No. 572.)

Claims.—1. A general described arrangement and construction of looms.

2. The use of a roller revolving at a continuously uniform rate, for delivering the warp from the warp-beam by frictional contact.

3. "The mode of delivering the warp from its beam at a regular uniform rate, by the action of a roller working in contact with the beamed warp."

THOMAS WEATHERBURN DODDS, of Holmes Engine and Railway-works, Rotherham, York, engineer. *Improvements in the manufacture of wheels and axles.* Patent dated March 7, 1853. No. 574.)

Claims.—1. A general described arrangement and construction of wheels and axles.

2. "The mode of binding together the detailed parts of wheels by means of coned or inclined surfaces on the bosses or naves of such wheels."

3. "The application of conical or inclined bosses or naves for binding the spokes, arms, or segments up inside the tyre."

4. "The mode of manufacturing tyres from bars coiled up, so as to furnish a continuous welding surface throughout the length of the coil; the contiguous surfaces of the folds being held together by dovetails or inclines."

5. The mode of manufacturing tyres by a combination of "volute and helical" coils.

6. The mode of retaining the folds or coils of tyre-bars together by the use of an external flanged or boxed piece.

7. The mode of making axles from a combination of pieces individually formed with duplex or multi-angled inclines, so as to dovetail or bind well together.

8. The use of the vapour of heated tar or bituminous matter, for the preparation of the wood used in the manufacture of wheels.

9. "The treatment of wood used for wheels by boiling or steeping it in a compound of red-lead and bituminous matter."

Augustino Carosio, of Genoa, now of Montagu-street, Middlesex, doctor of medicine. *A hydrodynamic battery, or new or improved electro-magnetic apparatus, which, with its products, are applicable to the production of motive power, of light, and of heat.* Patent dated March 7, 1853. (No. 575.)

This invention consists in apparatus or machinery for decomposing water or other suitable liquid by means of electricity, obtained from an electrical apparatus constructed on the principle of that known as "Groves' Gas Battery," or of a battery similar thereto, and in employing separately the gases so obtained for the production of motive power by their elastic force, and afterwards in recombining such gases in the gas battery, to form the liquid from which such gases were originally produced, and in which recombination a current of electricity is generated for decomposing the water or other liquid employed.

Thomas James Perry, of the Lozells, Aston-juxta, Birmingham, Warwick, engine turner. *A new or improved method of constructing cornice poles, and picture and curtain-rods, and other rods from which articles are suspended.* Patent dated March 8, 1853. (No. 579.)

Claims. — 1. Constructing the articles enumerated in the title by placing a rod "in the axis of a tube," the rings from which the curtains or other articles are suspended sliding on the said rod, and being connected with the curtains or other articles through a slot in the said tube.

2. Spreading or opening curtains by the use of a helical spring in the interior of cornice-poles or curtain-rods, whether the said curtains be suspended on the same spring, or on a rod "in the axis of the said spring," and withdrawing the said curtains by compressing the said spring by means of a cord.

Jacques Francisque Pinel, of Pall-mall, Middlesex, agricultural chemist. *Improvements in deodorising sewage water and cesspools, and in manufacturing manures.* Patent dated March 8, 1853. (No. 581.)

This invention consists in applying to sewage water sulphate of zinc, potass, alum, chloride of sodium, and sand, so as to precipitate the solid matter contained in it, and then manufacturing the solid deposit into manure by combining it with such substances as pulverised chloride of sodium, nitrate of potass, soot, ashes, slaked lime, or muriate of ammonia, that will concentrate the gases necessary to vegetation.

Nicolas Schmitt, of Goffontaine, near Sarrebrück, Prussia, manufacturer. *Improvements in cleansing and separating ores and coal.* Patent dated March 8, 1853. (No. 582.)

An account of this invention forms the first article of this Number.

Charles Baker, of Southampton, merchant. *Improvements in mould for the manufacture of bricks.* Patent dated March 8, 1853. (No. 583.)

This invention relates to the manufacture of hollow bricks, and consists in forming the bottom of the mould with upright projections of the form it is intended to give to the perforations or hollows in the brick. The other part of the mould is placed on to this bottom.

Claim.—The described improvements in moulds, for the manufacture of bricks.

Samuel Cunliffe Lister, of Bradford, York, manufacturer. *Improvements in machinery used in washing wool.* Patent dated March 8, 1853. (No, 584.)

This invention consists in causing the travelling-apron of machines used in washing wool to pass to the bottom, or nearly so, of the washing-bowl or vessel, by which means the washer is able to place the wool upon the said apron with more than ordinary ease; and it further consists in covering the washing-rollers with vulcanized cautchouc instead of wool, by which the inventor proposes to save both trouble and expense.

John Wright, of Camberwell, Surrey, engineer. *Improvements in the construction of bedsteads and other frames.* Patent dated March 8, 1853. (No. 585.)

This invention consists in constructing the uprights or posts of bedsteads and other frames of two parts, capable of being connected by a screw and nut passing up the centre. The side and end, or other rails, are each made with inclined ends, and each with a portion of a circular groove on the upper and under sides thereof. The two parts of each of the posts or uprights have on the ends which are moved towards each other by the screw and nut corresponding circular projections with inclined sides, so that in the act of their being drawn together

they will draw the two rails together, and thus hold all parts securely. The inventor claims the above method of constructing bedsteads and other frames.

ALEXANDER SAMUELSON, of Hull, York. *Improvements in the manufacture of bricks and tiles.* Patent dated march 8, 1853. (No. 586.)

Claim.—The giving motion to the plugs or valves of brick and tile-machines at proper intervals, by means of "any combination of mechanical parts actuated by one or more of the moving parts of such brick and tile-machines; and also, a particular-described combination of parts and gearing to be employed for that purpose."

FREDERICK WILLIAM EMERSON, of the Trereiffe Chemical-works, Penzance. *Improvements in obtaining tin from ores.* Patent dated March 8, 1853. (No. 587,)

This invention consists in a means of purifying and separating the ore of tin from other metallic oxides, sulphurets, arseniates, tungstates, or other compounds, previously to its introduction into the smelting furnace, by digesting the ore (either with or without the aid of heat) in a mixture of common salt, sulphuric acid, and nitrate of soda or potash; the last of these not being absolutely necessary to the success of the operation, though it helps to shorten the time in which the process is performed.

The inventor first makes a correct analysis of a fair sample drawn from the bulk of the ore to be operated upon, in order to ascertain the exact nature and amount of the impurities. In the event of its being found to contain any compound of sulphur or arsenic, he first roasts or calcines the ore by any of the ordinary known methods. This process is not necessary, unless such compounds are present. If it is found to contain oxide of tin—the ores of tin mostly occur as a peroxide—it will be necessary, in order to avoid loss, either first to peroxide it, or afterwards to precipitate from solution by the insertion of metallic zinc, or any other precipitating agent. To peroxidize the oxide of tin, he saturates the bulk of the ore to be operated upon with nitric or nitrous acid, and after allowing it to stand for two or three hours, to permit a full reaction to take place, he puts it into an iron, fire-clay, or other convenient retort, and distils or evaporates it to dryness, receiving the nitric or nitrous acid gases into stoneware or other convenient condensers, to be used over again. He then mixes the ore with such a quantity of common salt, as by decomposition with sulphuric acid shall yield a sufficient amount of muriatic acid to combine with the contained impurities of metallic oxides, or bring the oxides of iron and manganese in wolfram, or the lime in tungstate of lime into a soluble state. He then puts the ore thus mixed with salt into a cistern formed of granite, slate, stoneware, or other material that is not seriously acted upon by acids (a wooden trough has been found to answer the purpose), and pours upon it such a quantity of either brown acid, or oil of vitriol, as will effect the decomposition of the salt. The inventor prefers to use an excess of sulphuric acid. He then turns into the mixture a jet of steam from a steam-boiler, so as to keep the said mixture at about 200° Fahrenheit, stirring it about from time to time with a wooden rake or shovel, so as to expose fresh surfaces to the action of the reagents, adding a small quantity, say 6 or 7 lbs. to the ton of nitrate of soda or potash, for the purpose of enlivening and quickening the operation. If the material should contain micacious or magnetic iron ores, it would be advisable to increase the amount of nitrate of soda or potash to assist their oxidation and conversion.

The inventor also describes analogous methods of treating the ores when copper or tungstate is contained.

Claim.—Purifying and separating the ores of tin by acting upon the contained impurities with a mixture of sulphuric acid and chloride of sodium, either with or without the addition of nitrate of potash or soda, with or without the application of heat by any known means.

JAMES VEEVERS, of Littleborough, Lancaster, cotton-spinner, and HENRY ASHWORTH, of the same place, manager. *Certain improvements in machinery or apparatus to be employed in the preparing of cotton and other fibrous materials for spinning.* Patent dated March 8, 1853. (No. 588.)

These improvements are principally applicable to drawing, slubbing, and roving-frames, and have for their object the instantaneous stopping of the machine in the event of the fibrous material "lapping" upon the drawing-rollers, or of the calendering-rollers becoming choked from that or any other cause.

Claim.—"A lever, resting upon the ends of the drawing-rollers, and connected to any suitable disengaging apparatus in such a manner that the raising of the said lever, either by the lapping of the rollers or otherwise, shall stop the revolutions of the machine."

JOHN JAMES ALEXANDER MACCARTHY, of Howland-street, Saint Pancras, gentleman. *Improvements in gunnery and projectiles (with pouch) which are adapted for muskets, rifles, pistols, and heavy cannon, for field-pieces or forts, batteries, ships of war,*

and other vessels. Patent dated March 8, 1853. (No. 591.)

This invention relates; *firstly*, to a new mode of constructing breech-loading muskets; *secondly*, to a method of attaching the bayonet permanently to the musket; *thirdly*, to a method of constructing cannon with a moveable charge-chamber; *fourthly*, to the application of a powerful spring to cannon to check the recoil; *fifthly*, to a mode of constructing bullet-cartridges; and *lastly*, to a mode of constructing pouches.

JAMES KIMBERLEY, of Birmingham, Warwick, manufacturer. *A new and improved gas-stove.* Patent dated March 9, 1853. (No. 592.)

Claims.—1. Constructing gas-stoves having two or more tubes, underneath or in each of which a gas-flame is situated, the said tubes opening at their lower ends to the atmosphere, and at their upper ends into a common chamber.

2. The use of perforated diaphragms in the chamber of gas-stoves, for the purpose of abstracting the heat from the heated air, and products of combustion passing through the said chambers.

SAMUEL BLACKWELL, of Oxford-street, London. *An improved strap or band for connecting together certain parts of harness and saddlery, applicable also to other purposes where straps or bands are used.* Patent dated March 9, 1853. (No, 594.)

Claim.—"The combining of India-rubber, or vulcanised India-rubber, with hemp or other strong material, as described."

SAMUEL BLACKWELL, of Oxford-street, London. *Improvements in saddlery and harness.* Patent dated March 9, 1853. (No. 595.)

Claims.—1. The construction of dumb jockeys of gutta percha, or of gutta percha and wood combined, or of gutta percha, wood, iron, and leather combined.

2. The use and application to jockeys of dumb reins and an elastic crupper, as described.

3. The use and application to harness of springs of India-rubber, or vulcanised India-rubber, either separately or in combination with string or webbing.

4. The use and application of gutta percha, either separately or in combination with leather and iron, in and for the manufacture of curb-biters for horses, as described.

FRANÇOIS VALTAT, and FRANÇOIS MARIE ROUILLE, of Rue Ranbuteau, Paris, manufacturers. *Improvements in the construction of the combs of looms for weaving.* Patent dated March 9, 1853. (No. 596.)

The combs above referred to are employed for the purpose of producing woven fabrics, having plaits or folds therein; and the improvements consist in making them with long and short teeth, suitably arranged according to the particular effect required to be produced on the woven fabric.

WILLIAM PIDDING, of the Strand, gentleman. *Improvements in the treatment or manufacture of caoutchouc or gutta percha, in fabrics obtainable therefrom, and in the machinery or apparatus employed therein.* Patent dated March 9, 1853. (No. 598.)

The invention consists in producing ornamental fabrics applicable for various purposes by stretching sheets of India-rubber or gutta percha to about eight to sixteen times their natural dimensions, then piercing them with small holes according to any pattern previously marked thereon, inserting studs of metal, glass, or other material, or threads of any textile material in these holes, and then allowing the sheets to contract to their original size, so as to hold the studs or threads firmly in the holes.

Another mode of producing fabrics from sheets of India-rubber, consists in distending the sheets as before directed, and then by means of adhesive cement applied at intervals attaching threads to the surface. When the India-rubber is allowed to contract, the threads will rise from the surface, except where held down by the cement, and give the appearance of uncut pile.

GEORGE CHAMBERS, of Russia-row, Cheapside, London. *Improved means of gathering cinders and depositing ashes under fire-grates, securing economy in fuel and cleanliness of appearance.* Patent dated March 9, 1853. (No. 599.)

This invention consists in forming a wire grating, or some such article, which hangs on in front, and extends underneath the stove.

Claim.—An apparatus for gathering or retaining cinders and coal, the ashes being allowed to fall through it, such apparatus being hung or otherwise affixed to the bars, fronts, or sides of fire-grates, of whatever form such cinder-holder may be made.

THEOPHILUS JOHN NASH, of High Holborn, Middlesex. *Imporvements in churns.* Patent dated March 9, 1853. (No. 600.)

The inventor describes and claims a combination of apparatus for giving an up-and-down and rotary motion to the dashers of churns, such motion being communicated by a winch-handle on the axis of which is a toothed wheel, which takes into and gives a motion to a similar wheel. On the axis of each of these wheels is fixed an eccentric, and between the two eccentrics there is a disc, which is affixed to the spindle of the dasher of the churn, and which by the rotation of the winch handle will be caused to rotate, and to rise and fall.

GEORGE COLLIER, of Halifax, York, mechanic. *Improvements in the manufacture of carpets and other fabrics.* Patent dated March 9, 1853. (No. 601.)

Claims.—1. The application of an additional instrument to withdraw the wire a short distance.

2. The giving additional support to the wire.

3. The preventing the wires leaving the holder when being inserted.

4. The forming of wires for making uncut terry fabrics with a thin turned-up end.

5. The application of a comb in front of the lathe, to clear the warp threads of the shed.

6. The laying of the pile of uncut terry fabrics by pressing surfaces.

7. The applying rising and falling shuttle-boxes, suitable to receive shuttles carrying different thicknesses of weft, in order to insert thicker weft on the back than is on the face of terry and velvet carpets and rugs when made by power in combination with Jacquard or figuring-machines.

8. The causing that part of the shuttle race which is below the warp when two shuttles are employed, to rise or fall for the support of the shuttle next to be introduced into the shed.

EDWARD MAITLAND STAPLEY, of Lawrence-lane, London. *Improvements in machinery for breaking and dressing flax and other fibrous materials.* Patent dated March 9, 1853. (No. 602.)

This invention consists of a machine of peculiar construction for breaking and dressing flax and such like fibres preparatory to scutching. The flax, &c., is fed on to an endless apron, and received between fluted feed-rollers, from which it passes to a box or chamber by a narrow aperture, which can be adjusted at pleasure. Inside this box is a cylindrical beater, through which is formed a long narrow slit, into which the flax enters, and in which it is held while the beater receives a vibratory motion, the effect of which is to shake the fibre, and beat it against the rests or entrance into the box. The detached matters are carried away by a blast of air produced by any blower, and directed into the box. From this beater the flax passes between two rollers, and is received on an endless apron, from which it is taken and subjected to a scutching-machine, which may be combined with that above described.

HENRY RANSFORD, of Chelsea, gentleman. *Improvements in the manufacture of starch.* Patent dated March 9, 1853. (No. 603.)

The *first* of these improvements consists in employing pressure, produced by pumping the liquid into a closed vessel, in aid of the steeping process, for the purpose of more effectually separating the gluten and other matter from the starch.

The *second* improvement has for its object a mode of obtaining a further pressure at the stage of manufacture called "boxing." This is effected by using boxes with false perforated bottoms, covered with woven fabrics, and connecting an air-pump to the space beneath the false bottoms, so as to withdraw the air therefrom, and allow the pressure of the atmosphere to act on the upper surface of the fluid starch in the boxes, and cause the fluid parts to be more quickly separated than would result from mere subsidence.

FREDERICK WILLIAM CAMPIN, of the Strand, Middlesex. *An instrument for measuring the steerage-way of vessels, and the rapidity of currents of water and air applicable to ventilating ships and railway carriages.* (A communication from Messrs. Overduyn and Droinet.) Patent dated March 10, 1853. (No. 606.)

This invention consists, *first*, in the application of hydrodynamic, and more especially of negative pressure as a means of measuring the speed of vessels and currents; and, *second*, in the use and arrangement of metallic plates or elastic tubes for the purpose of determining the results of this pressure.

JAMES WALMSLEY, of Scout, Newchurch, near Manchester, woollen printer. *Improved machinery and arrangements for block-printing.* Patent dated March 10, 1853. (No. 607.)

This invention relates to the printing of druggets, and consists in certain machinery for block-printing by means of blocks arranged so as to traverse across the fabric, and imprint two or more impressions side by side, together with arrangements for regulating the traversing motion of the blocks, and the alternating motion of the furnishing and colour-rollers, and other arrangements for keeping the fabric extended during its passage through the machine.

JOHN POWIS and JABUS STANLEY JAMES, both of Watling-street, London, wholesale ironmongers. *Improvements in machinery for slotting, tenoning, mortising, grooving, drilling, boring, and vertical planing.* Patent dated March 10, 1853. (No. 608.)

The patentees describe and claim an arrangement of machinery for the purposes mentioned in the title, a description of which will be given in our next Number.

EDWARD TAYLOR BELLHOUSE, of the firm of E. T. Bellhouse and Co., of Manchester, engineers. *Improvements in iron structures.* Patent dated March 10, 1853. (No. 609.)

Claim.—"The system or mode of constructing the pilasters, columns, or vertical supports, rafters, gutters, and cross-pieces of iron buildings, with one or more flanges undulating or straight, cast longitudinally along their sides at any required angle with or diametrically opposite to each other," for the purpose of enabling the edges of the plates or sheets of metal forming the sides and roof of the building to be bolted or riveted thereto.

THOMAS BUTLER DODGSON, of Upper Clapton, Middlesex, gentleman. *Improvements in roads or ways, pavements, and footpaths generally.* Patent dated March 10, 1853. (No. 610.)

This invention consists of a mode or modes of constructing roads or ways, pavements, and footpaths, partly of metal and partly of other materials. The metallic part or parts the patentee makes in frames constructed in such a manner as to form spaces or compartments, which may be filled with wood, stone, or any other similar material.

PROVISIONAL PROTECTIONS.

Dated May 18, 1853.

1219. George Underwood, of Stitchill, Roxbourgh, North Britain, gentleman. Improvements in preparations from sulphate of iron to be employed as medicines.

Dated May 28, 1853.

1314. George Harriott, of Islingham, Frindsbury, Kent, gentleman. Improvements in agricultural implements employed in crushing and rolling land, and in frames for the same.

1324. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in removing the gummy or glutinous matter from textile and other materials. A communication from Messrs. Alcan and Limet, of Paris, France, civil engineers.

Dated August 5, 1853.

1828. Joseph Lallemand, of Besançon, France, chemist. The manufacture of paper from peat.

Dated August 10, 1853.

1862. Thomas MacSweny, of America-square, London. Improvements in the construction of ships and vessels.

Dated August 11, 1853.

1876. William Longmaid, of Beaumont-square, Mile-end, Middlesex. Improvements in the manufacture of manure.

Dated August 13, 1853.

1897. John Perkins, of Manchester, mechanical draughtsman. Improvements in the manufacture of oils.

Dated August 22, 1853.

1950. William Schmollinger, of Gracechurch-street, London, gentleman, and Edward Grainger Smith, of Lambeth, Surrey, machinist. Improvements in the means of converting reciprocating or rectilinear motion into rotatory motion.

1952. John Steven, of Edinburgh, Scotland, railway-carriage builder. An improved axle-box for railway carriages and wagons.

1954. Victor Emile Warmont, of Neuilly, Seine, France. Improvements in dyeing and ornamenting skins, fabrics, and other substances.

Dated August 23, 1853.

1956. Charles Cowper, of Southampton-buildings, Chancery-lane, Middlesex. Improvements in the permanent way of railways. A communication.

1958. Moses Poole, of Avenue-road, Regent's-park, Middlesex. Improvements in crushing and pulverizing quartz and other substances. A communication.

1960. Thomas Charles Medwin, of the firm of Messrs. Medwin and Hall, Blackfriars-road, Middlesex, engineers. Improvements in steam-engine boilers.

1964. William Mann, of Stepney, Middlesex, gas engineer. Improvements in the purification of gas, and in the treatment of the material used in such purification.

Dated August 24, 1853.

1966. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn. Improvements in firearms. A communication.

1967. Benjamin Hornbuckle Hine and Anthony John Mundella, of Nottingham, manufacturers, and Thomas Thompson, also of Nottingham, mechanic. Improvements in machinery for the manufacture of textile and looped fabrics.

1969. Thomas Foster, of Manchester, Lancaster, engraver and lithographer. Certain improvements in machinery or apparatus applicable to etching or engraving upon plain, cylindrical, or other surfaces.

1970. Thomas Hill, of Glasgow, Lanark, North Britain, modeller, and Alexander Thomson, of the same place, brick-builder. Improvements in the manufacture of pipes or hollow articles from plastic materials.

1971. George Pollard, of Watling-street, London, envelope-manufacturer, and George Mumby, of Hunter-street, Brunswick-square, Middlessex, mechanical draughtsmen. Improvements in machinery or apparatus for the manufacture of envelopes.

1972. Alfred Augustus de Reginald Hely, of Cannon-row, Westminster, Middlesex, civil engineer. Certain improvements applicable to shades or chimneys for lamps, gas, and other burners.

1973. Alfred Swonnell, of Kingston-on-Thames, Surrey, gentleman. An improved construction of tie for neckcloths and neck-ribbons, applicable also to neck-ribbons of caps and bonnets.

1974. Edward Heard, of Regent-street, Lambeth, Surrey, chemist. A certain mixture or composition of chemical agents for rendering sea-water fit for washing and for softening hard water for similar purposes.

1975. Charles Collyford Banks, of Clapham, Surrey, brassfounder and finisher. Improvements in lubricators.

Dated August 25, 1853.

1976. Alfred Beck Thompson, of Richmond, Surrey, gentleman. A new or improved spring door hinge. A communication.

1977. William Austin, of Hollywell-street, Westminster. Improvements in the manufacture of blocks of plastic materials for building purposes.

1979. George Davis, of London. Certain apparatus for distinguishing genuine from counterfeit coin.

1980. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agent. Machinery for dig-

ging, breaking, and trenching land. A communication.

Dated August 26, 1853.

1981. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agent. Improvements in the treatment of wool and silk, and in machinery for preparing silk so treated. A communication.

1982. Eugene de Varroc, of Great Chesterfield-street, Middlesex, artist. Certain means of depriving caoutchouc of all unpleasant odour, and of imparting to it various agreeable perfumes.

1983. Robert Wilson, of Glasgow, Lanark, North Britain, calenderer Improvements in the treatment or finishing of textile fabrics.

1984. William Watson, junior, of Leeds, manufacturing chemist. Improvements in apparatus for manufacturing prussiate of potash.

Dated August 27, 1853.

1985. Richard Roberts, of Manchester, engineer. Improvements in the construction of casks and other vessels.

1986. Alexander Louis Bargnaoo, of New York, United States, gentleman. Improvements in the manufacture of paper and pasteboard.

1987. William Hargreaves, of Bradford, York, machine wool-comber. Improvements in machinery for preparing and combing wool, hair, flax, silk, and other fibrous substances.

1988. Charles William Lancaster, of New Bond-street, Middlesex, gun-maker. A method of, and machinery for, manufacturing or producing certain descriptions of gun and pistol barrels.

1989. James Hill, of Stalybridge, Lancaster, cotton-spinner. Certain improvements in machinery used for spinning, doubling, and winding cotton, wool, flax, silk, and other fibrous materials.

1990. Rodolphe Helbronner, Congreve and chemical light manufacturer, of Spring-terrace, Vauxhall-walk, in the parish of St. Mary, Lambeth, Surrey. A chemical light, and apparatus for manufacturing the same.

1991. John Davie Morries Stirling, of the Larches, near Birmingham, Warwick, Esq. Improvements in the manufacture of rails and parts of railways, and tyres of railway wheels.

1992. Henri Georges Collier, gunsmith, of Paris, France. Improvements in rotary pumps.

1994. Alfred Vincent Newton, of 66, Chancery-lane, Middlesex, mechanical draughtsman. An improved construction of steam hammer. A communication.

1995. George Robinson, of Newcastle-upon-Tyne, physician. The novel application of the slags or refuse matters obtained during the manufacture of metals.

1996. Edward Lacy, of Handsworth, Stafford, maltster, and William Wilkinson, of Nottingham, pattern designer. A new description of cloth or fabric applicable to most purposes to which woven and knitted fabrics are applied.

1997. Josiah Hornblower, of Poplar, Middlesex, engineer. Improvements in machinery for steering vessels.

Dated August 29, 1853.

1998. John Foss, of Aldgate, London, stationer. Improvements in printing apparatus.

1999. Adolph Berend, of Fenchurch-buildings, London. Improvements in instantaneous light apparatus. A communication.

2000. Joseph Cundy, of Victoria-road, Kensington, Middlesex. Improvements in kitchen ranges and cooking-apparatus.

2001. Edward Patrick Gribbon, of Dublin, architect. Improvements in window-frames and sashes.

2003. Peter Armand Lecomte de Fontainemoreau, of South street, Finsbury, London. Certain improvements in the production of electricity. A communication.

Dated August 30, 1853.

2005. John Bald, of Carsebridge Distillery, Alloa, Clackmannan, North Britain, distiller, and Charles Maitland, of the same place, brewer. Improvements in distilling.

2007. Charles Goodyear, of Avenue-road, St. John's Wood, Middlesex. Improvements in combining India-rubber with other matters for writing, marking, and drawing. Partly a communication.

2008. Charles Goodyear, of Avenue-road, St. John's Wood, Middlesex. Improvements in rules, graduated scales, and measuring instruments.

2009. Charles Goodyear, of Avenue-road, St. John's Wood, Middlesex. Improvements in the manufacture and ornamenting or coating of articles when compounds containing India-rubber are used.

2010. Joseph Cundy, of Victoria-road, Kensington, Middlesex. Improvements in gas stoves.

2011. James Picciotto, of Crosby-square, London. Improvements in burning and reburning animal charcoal. A communication.

2012. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. An improved process of dyeing, part of which process is also applicable to bleaching. A communication.

2013. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery for cleaning bran or other offal obtained during the manufacture of flour. A communication.

2014. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery for cleaning grain and seeds. A communication.

Dated August 31, 1853.

2015. Ezra Washington Burrows, of Pentonville, Middlesex, civil engineer. Improvements in the construction of cranes and other machines for raising heavy bodies.

2016. Astley Paston Price, of Margate, Kent, chemist. Improvements in treating wash waters containing soap, oils, saponified or saponifiable materials, and in obtaining products therefrom.

2017. Thomas Dawson, of King's Arms-yard, London, machinist, and Thomas Restell, of the Strand, Westminster, chronometer-maker. Improvements in fishing-rods.

2018. Grignon Meusnier, of Paris, France, clock-manufacturer. Improvements in carriage-clocks.

2019. Edward Smith, of Love-lane, London, gentleman. An improved mode of manufacturing carpets.

2020. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery for reaping and gathering corn, grain, and other agricultural produce. A communication.

2021. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery for making barrels and other casks. A communication.

2022. William Beckett Johnson, of Manchester, Lancaster, manager for Messrs. Ormerod and Son, engineers and ironfounders. Improvements in steam engines, and in apparatus connected therewith.

2023. Henry Jeremiah Iliffe and James Newman, of Birmingham, Warwick, manufacturers. Improvements in the manufacture of buttons.

2024. John Phillips Grazebrook, of Audnam, near Stourbridge, Worcester, glass-manufacturer. Improvements in the working barrels of pumps, which improvements are also applicable to lining other metallic tubes.

2025. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agent. An improvement in paddle-wheels. A communication.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," September 9th,* 1853.)

786. James Caleb Anderson, Bart. Improvements in locomotive engines.

(*From the "London Gazette," September 13th,* 1853.)

875. James Taylor, Isaac Brown, and John Brown. Improvements in the manufacture or production of charred peat.

899. Constant Jouffroy Duméry. Improvements in the manufacture of paste and enamel buttons.

916. George Titterton. Improvements in brushes.

920. William Edward Newton. Improvements in treating refuse silk waste, and in converting it into a valuable product. A communication.

949. Andrew Blair. Improvements in propelling vessels.

950. John Smithurst. An improved plan for packing yarn and other materials.

960. Charles Reeves, junior. An improvement or improvements in swords.

992. William Tillie and John Henderson. Improvements in printing shirting fabrics.

993. James Emery. Improvements in the construction of gigs, dog-carts, and other vehicles.

1028. Joseph Hetherington. Certain improvements in reels for reeling or winding yarns.

1031. James Berry and Thomas Booth. Improvements in machinery or apparatus for printing or staining woven fabrics and paper.

1043. Jacques Stanislas Vigoureux. Certain improvements in the combing of wool and other fibrous materials.

1051. Barnabas Barrett. Improvements in the treatment of natural and artificial stone, and of articles composed of porous cements or plaster, for the purpose of hardening and colouring the same.

1060. James Reeves. Improved machinery for forging, stamping, crushing, or otherwise treating metals, ores, and other similar materials.

1085. Edward Walmsley. Improved modes of preventing accidents arising from an insufficient supply of water in steam boilers.

1106. Matthias Edward Boura. Improvements in saddlery and harness.

1136. David Law and John Inglis. Improvements in moulding or shaping metals.

1144. Thomas Murray. Certain improvements in breaks or drags for wheeled carriages, and in adapting the carriages for the application and use of such breaks.

1187. Edward Taylor Bellhouse. Improvements in steam boilers.

1216. Caleb Hill. Improvements in the construction of stays.

1324. John Henry Johnson. Improvements in removing the gummy or glutinous matter from textile and other materials. A communication.

1359. William Boyd. Improved apparatus for manufacturing chlorine or chlorides.

1425. Christopher Binks. Improvements in dryers, and in preparing drying oils for oil paints, varnishes, and other uses.

1666. Frederick Ransome. Improvements in the manufacture of artificial stone and similar wares.

1773. Theodore Dethier. An improved machine for mortising, drilling, and boring.

1806. Matthias Edward Boura. Improvements in supplying ships or other vessels with water, air, or ballast.

1862. Thomas MacSweny. Improvements in the construction of ships and vessels.

1876. William Longmaid. Improvements in the manufacture of manure.

1877. Hugh Lee Pattinson. Improvements in the recovery of sulphur from alkali waste.

1897. John Perkins. Improvements in the manufacture of oils.

1927. George Leedham Fuller. Improvements in steam engines.

1945. John Webster Cochran. Improvements in machinery for crushing, grinding, and pulverizing stone, quartz, or other substances.

1953. Auguste Edouard Loradoux Bellford. Improvements in the manufacture of certain mineral oils and paraffine. A communication.

1954. Victor Emile Warmont. Improvements in dyeing and ornamenting skins, fabrics, and other substances.

1955. Frederick Osbourn. Improved machinery for cutting woven and other fabrics.

1958. Moses Poole. Improvements in crushing and pulverizing quartz and other substances. A communication.

1959. James Webster. Improvements in pressure-gauges.

1960. Thomas Charles Medwin. Improvements in steam-engine boilers.

1980. Richard Archibald Brooman. Machinery for digging, breaking, and trenching land.

1987. William Hargreaves. Improvements in machinery for preparing and combing wool, hair, flax, silk, and other fibrous substances.

1988. Charles William Lancaster. A method of and machinery for manufacturing or producing certain descriptions of gun and pistol barrels.

1994. Alfred Vincent Newton. An improved construction of steam hammer. A communication.

1996. Edward Lacey and William Wilkinson. A new description of cloth or fabric applicable to most purposes to which woven and knitted fabrics are applied.

2012. Alfred Vincent Newton. An improved process of dyeing, part of which process is also applicable to bleaching. A communication.

2013. William Edward Newton. Improved machinery for cleaning bran or other offal obtained during the manufacture of flour. A communication.

2014. William Edward Newton. Improved machinery for cleaning grain and seeds. A communication.

2020. William Edward Newton. Improved machinery for reaping and gathering corn, grain, and other agricultural produce. A communication.

2021. William Edward Newton. Improved machinery for making barrels and other casks. A communication.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed September 8, 1853.

978. Thomas Knowles.
979. Frederick John Wilson.
1009. Samuel Plimsoll.
1117. James Egleson Anderson Gwynne.
1150. William Johnson.
1190. George Fitzjames Russell.

1310. William Henry Bentley.
1403. George Tillett.
1433. William David Paine and George Alfred Paine.
1476. Auguste Edouard Loradoux Bellford.
1498. George Young.
1553. Richard Archibald Brooman.
1570. George Arthur Biddell.
1611. William Woods Cook.
1630. Louis Brunier.
1631. Stephen Martin Saxby.
1632. Moses Poole.
1648. Fabian Wrede.
1662. Abraham Walker Craig, Daniel Foster, and Thomas Valentine.
1677. John Yule.
1678. William Little.
1685. Charles Liddell.
1700. Jacques Rives.
1701. Benjamin Burrows.
1703. Samuel Colt.
1721. Alexander Cochran.

Sealed September 9, 1853.

598. William Pidding.
606. Frederick William Campin.

Sealed September 12, 1853.

625. Nicholas Auguste Eugène and Leopold Mouren.

Sealed September 15, 1853.

642. William Morgan.
665. Paul Cameron.
671. John Haskett.
682. Henry Bousquet.
706. John Henry Park and Joseph Park.
782. Robert Evans Peterson.
1692. Isaac Taylor.
1716. Moses Poole.
1718. James Shield Norton and Henry Jules Borie.
1730. Alexander Isaac Austen.
1734. Mary Ann Rylands.
1760. Joseph Barrans.
1762. Lansing E. Hopkins.
1765. John Knowles.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
Sept. 3	3506	T. H. and G. F. Busbridge	East Malling	Paper-roller.
6	3507	J. Sheldon	Birmingham	Letter-balance.
8	3508	T. Turner & J. F. Swinburne.	Birmingham	Tail-pin breech.
10	3509	Doulton and Watts	Lambeth	Jar.
12	3510	W. Aston	Birmingham	Button.
14	3511	J. W. Jones and W. Westley	Holborn	Antigropelos.

NOTICE TO CORRESPONDENTS.

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POWIS AND JAMES' PATENT SLOTTING, GROOVING, AND MORTISING-MACHINE.

Fig. 2.

Fig. 1.

Fig. 3.

POWIS AND JAMES' PATENT SLOTTING, GROOVING, AND MORTISING-MACHINE.

(Patent dated March 10, 1853.)

The peculiar feature of novelty which distinguishes this machine from others of its class consists in the arrangement adopted for giving a vertical motion to the working tool; this motion being obtained from a crank or levers actuated by suitable gearing from a continuously revolving shaft. The general construction of the machine will be readily understood from the following description, and a reference to the engravings on our front page:

Fig. 1 is a side elevation, fig. 2 a front view, and fig. 3 a back elevation. A A is the framework, which also forms the base for the upper parts of the machine to rest on. The top surface of this framework is planed perfectly true, and has formed upon it the V-pieces, *a a*, in which the slide, B, is capable of being moved to and fro in a longitudinal direction when acted upon by the hand-wheel, C, keyed upon the spindle, D, which has keyed upon its centre part a pinion, E, shown in dotted lines in fig. 3, which gears into the teeth of a rack bolted to the under side of the slide, B. By this means the exact longitudinal position of the slide can be regulated so as to bring the wood or other material to be operated upon immediately beneath the action of the cutter. F is another slide, which works transversely in V-grooves, *b b*, upon the slide, B, and is adjusted to the cutter by the hand-wheel, G. H H¹ are two jaws, between which the material to be operated upon is held. The jaw, H, is cast in a piece with the slide, F, while the jaw, H¹, is free to slide backwards and forwards, and is adjusted to the requisite gauge by the screw, I, tapped through a nut in the bracket, K, and turned by the hand-wheel, L. M is an upright frame, the lower portion of which slides in V-grooves, *c c*, on the framework, A, but is retained in its proper position by the screw and nut, *d*, passed through the slot, *e e*. By means of this slot, *e*, the height of the frame, M, can be regulated to adapt it to the stroke of the cutter. N is a vertical shaft, which slides up and down in the bearings, O O¹, upon the frame, M. The lower end of this shaft is formed with a socket, in which the working tool is inserted, and then held firm in its place by the screw, *i*. The upper part of the shaft is capped with the T-piece, P, from which are pendant the two rods, Q Q. R is a counterbalance lever, centred upon the frame, M, at *g*, and connected to the lower ends of the rods, Q Q. S is a bevel pinion, cast in a piece with a hollow tube, *h*, through which the shaft, N, passes. This tube, *h*, is held in the bearings, O¹, and is provided with holes, into which the end of the pin, *f*, takes, so as to hold the cutting-tool firm, and also to enable the tool to be reversed. The bevel-wheel, S, is connected to the shaft by means of a feather and groove. T is a second bevel-wheel, upon the shaft, *l*, supported and turning in the bracket, U, bolted to the frame, M. W is a crank-handle for imparting motion to the bevel-wheels, S and T, and through them to the shaft, N, when the machine is to be used for drilling or boring, a tool proper for such purposes being then inserted into the socket in the end of the shaft. X is a spur-wheel upon the spindle, D, and Y a pall, which takes into the teeth of the spur-wheel, D. This pall is centred upon a pin in the end of a bell-crank lever, Z, which is centred at *m* in the bracket, *n*, upon the framework, A. *o* is a lug, projecting from the lever, Z, and *p* a rod pendant from the lever, R, and passed through a hole in the centre of the lug, *o*; *r* is a stop or ferrule upon the rod, *p*, which is capable of being retained in any required position on the rod by the pinching screw, *s*. The object of this arrangement is to give to the slide, B, and the material to be operated upon, their proper and regular feed beneath the cutter. *t* is a band of vulcanized India-rubber, which embraces the bracket, *n*, and bell-crank lever, and so acts as a spring to draw back the pall when the lever, R, is raised. The action of this machine is as follows:

Supposing the machine to be used for either mortising, grooving, or slotting, a tool adapted to the peculiar kind of work is inserted in the socket in the end of the shaft; the wood or other material to be operated upon is then placed between the jaws HH′, and its position beneath the cutting-tool determined by means of the hand-wheels C and G. The cutter is then set to work by depressing the lever R, which brings the cutter into contact with the wood. The lever R is then raised, which causes the rod *p* to be depressed and (through the medium of the stop *r*, bell-crank lever Z, and pall Y,) the spur-wheel X to make a partial revolution, while the pinion E, gearing into the rack upon the underside of the slide B, causes that slide to be moved forward the requisite amount of feed so as to advance the food for a fresh cut. The amount of feed can be regulated by shifting the stop *r* either up or down the rod *p*. When it is desired to reverse the cutter, the pin *f* is withdrawn, the shaft turned, and the pin again inserted in the opposite hole, at the same

time the pall is reversed so as to act upon the opposite side of the spur-wheel, whereby the slide B is caused to traverse in the opposite direction.

When it is desired to apply the machine to drilling or boring, it will be necessary to employ a tool adapted for such purposes, and to give to the spindle or shaft carrying such tool a rotary motion by means of the bevel-wheels, S and T, and crank-handle W.

ON THE NATURE OF ALGEBRAIC SERIES.

Prob. To find a series of the positive and ascending powers of y, which shall represent the value of u_{x+y}, whenever such series exists and such development is possible.

The natural place of the calculus of finite differences being immediately after the elements of algebra, we shall assume its notation as known.

Carnot having demonstrated the true principles of the Differential Calculus independently of the doctrine of Series, we shall also presuppose the elements of that calculus.

By the notation of the calculus of finite differences,

$$u_{x+h}={}_xu+\Delta_x u,$$

$$\therefore u_{x+2h}=u_x+2\Delta_x u+\Delta^2 u_x,$$

$$u_{x+3h}=u_x+3\Delta u_x+3\Delta^2 u_x+\Delta^3 u_x,$$

and by successive inferences it is proved that

$$u_{x+nh}=u_x+\frac{n}{1}\Delta u_x+\frac{n.\overline{n-1}}{1\cdot 2}\Delta^2 u_x\ldots\ldots\Delta^n u_x. \quad (1).$$

The co-efficients following the binomial law. From this theorem it follows that the series

$$u_x+\frac{y}{h}\frac{\Delta u_x}{1}+\frac{y}{h}\left(\frac{y}{h}-1.\right)\frac{\Delta^2 u_x}{1\cdot 2}+\&c.\ldots\ldots(2.)$$

equals

$$u_x \text{ when } y=0,$$

$$u_{x+h} \text{ when } y=h,$$

$$u_{x+2h} \text{ when } y=2h,$$

$$u_{x+3h} \text{ when } y=3h,$$

&c. And that, therefore, between the limits

$$y=0, y=a,$$

the series (2) and the function

$$u_{x+y}$$

have as many values in common as there are integers in

$$\frac{a}{h}+1.$$

This number increases as h diminishes, and ultimately, when h vanishes, it becomes infinite; and the series (2) and the function

$$u_{x+y}$$

have all their values in common between $y=0$ and $y=a$.

It remains to inquire what form the series then assumes? The $\overline{m+1}$th term of (2) may be written in the form

$$\frac{y.y-h.y-2h\ldots.y-\overline{m-1}^h}{1\cdot 2\cdot 3\cdot\ldots m}\;\frac{\Delta^m u_x}{h^m}.$$

When $h=0$, this becomes

$$\frac{y^m}{1\cdot 2\cdot 3\cdot - m}\;\frac{du^m}{dx^m},$$

provided m be not infinite. And the first $\overline{m+1}$ terms of the series are, when $h=0$,

$$u+y\frac{du}{dx}+\frac{y^2}{1\cdot 2}-\frac{du^2}{dx^2}\ldots.+\frac{y^m}{1\cdot 2\cdot 3\cdot m}\;\frac{du^m}{dx^m}\ldots.(3.)$$

This is true whatever finite value be attributed to m. When m is infinite,

$$\overline{m-1}h$$

may be a finite quantity, and since h and y have the same signs

$$y-\overline{m-1}\,h$$

will in this case be $< y$. Therefore the

$$\overline{m+1}\text{th}$$

term is, in this case,

$$< \frac{y^m}{1\cdot 2\cdot 3\cdot\ldots m}\;\frac{du^m}{dxm}.$$

Now suppose the series (3) to be convergent, so that all the terms beyond the pth may be neglected; then *à fortiori*, all the

terms of (2) beyond the pth may be neglected, for if not equal to they are less than those of (3). Therefore, in this case,

$$u_{x+y}$$

is equal to (2). That is to say, whenever the series

$$u+y\frac{y}{1}\ \frac{du}{dx}+\frac{y^2}{1\cdot 2}\ \frac{du^2}{dx^2}+\&c.,$$

converges to a limit,

$$u_{x+y}$$

is that limit.

The advantages of this manner of investigating the nature of algebraic series are:

1. That it is not hypothetical; as the methods in common use are.

2. That its application is limited, *à priori*, to the cases in which the series converges; as the methods in common use are not.

3. That it teaches the true character of an infinite series; showing it to be the ultimate term at which we arrive by an infinite number of interpolations; and that it may be applied whenever the limits are such that a finite series, derived from a limited number of interpolations, can be employed as an approximation.

The series (3) may always be rendered convergent by taking the limits sufficiently near together; but it cannot be applied when between those limits there are contained one or more infinite values of the function, or of any of its differential coefficients. For if the series (3), or any of its differential co-efficients, becomes infinite for *any* value of y, it will also be infinite for the same value plus h. These series cannot *pass through* infinity. If once infinite they are always so.

ALEXANDER Q. G. CRAUFURD, M.A.

HOLLOW RAILWAY AXLES.

THE following is a description of a new method of manufacturing hollow railway axles invented by Mr. J. E. McConnell, of Wolverton, and described by him in a paper read at the recent meeting of the Institution of Mechanical Engineers at Birmingham, July 27, 1853:

The subject of Railway Axles was brought before the Institution on a former occasion by the writer, when he gave the result of various experiments, showing the form and dimensions most economical of material, with a proportionate and proper strength of the several parts, and also the changes in the structure of the iron which appeared to have taken place from various causes during the course of working. Since that period the writer's attention has been constantly directed to the subject, and the opinion he then expressed respecting the fracture of axles arising from changes from the fibrous structure of iron, to a brittle, short-grained, or crystalline condition, has been confirmed by repeated instances which have come under his knowledge.

With the view of improving the strength and durability of railway axles, the two most important points for insuring the safety and security of railway travelling, the writer, after repeated experiments, and obtaining all the experience and information he could collect on the subject, arrived at the conclusion that the hollow or tubular axle combined in itself, if properly manufactured, all the properties necessary to secure the best form for lightness, strength, uniformity of structure in the material, elasticity to neutralize the injurious effect of blows and concussions, and consequent durability, from having a greater freedom from deteriorating effects.

The selection of the tubular form of axle originated from the knowledge, that with a considerably less weight of material in the form of the tube, a much greater strength can be obtained to resist torsion, deflection by pressure or weight, or concussion from blows. The resistance of a solid cylinder to deflection and torsion, increasing in proportion to the fourth power of the diameter (or the square of the square), but the weight increasing only as the square of the diameter, two solid cylinders, having the respective diameters of 4 and 5 inches, or 1 to 1¼, will have a proportionate weight of 16 to 25, or 1 to 1½, but a resistance of 256 to 625, or 1 to 2½. Then if a hollow of two-thirds the diameter be made in the larger axle, its weight will be diminished one-half ($\frac{2}{3}\times\frac{2}{3}=\frac{4}{9}$ or $\frac{1}{2}$ nearly), and its resistance only 1-5th ($\frac{2}{3}\times\frac{2}{3}\times\frac{2}{3}\times\frac{2}{3}=\frac{16}{81}$, or $\frac{1}{5}$ nearly), and the comparison with the smaller solid axle will then be 1 to 1¼ in diameter, 1 to seven-eighths in weight, and 1 to 2 in resistance; being double the resistance, with one-eighth less weight.

The use of hollow axles was tried some years ago, but was not continued, the main object being that there appeared a great difficulty of insuring, by the particular mode of manufacture adopted at that time, a sufficient uniformity of thickness of the sides of the tube throughout, and also of the soundness of material. The mode adopted consisted of rolling two or three bars of a semicircular cross-section, which were welded together with butt joints, but with no internal pressure, and with solid ends where the bearings came. These axles, having no maundril or internal pressure during the process of welding, were

found to be of a very uncertain strength throughout the axle, and the weakest point might be close to that part where the greatest force or strain would be exerted.

To overcome these objections, a mode of manufacturing railway axles has been introduced by the writer, which it is believed effectually accomplishes the objects in view, securing the utmost strength with the least possible amount of material, uniformity of structure of the iron, perfect equality of thickness of material, and soundness of manufacture.

The plan adopted is as follows:—A number of segmental bars of the best quality of iron are rolled to such a section as to form, when put together ready for welding, a complete cylinder, about one and a half times the diameter of the axle when finished, the bars fitting correctly together, so as to have no interstices, and overlapping in such a manner as to insure a perfect and sound weld when completed.

This cylinder of loose segmental bars is temporarily held together by a screw-clip, and each end being put into the furnace until a welding heat is produced, the bars are then partially welded together and the clip removed. The whole cylinder is then placed in the furnace, and brought to a proper welding heat; it is then passed through a series of rollers, which have each a maundril of an egg form, in the centre of the circular openings, which are attached and supported on the end of a fixed bar, the fixed bar being firmly secured at the opposite end, to resist the end pressure or strain during the process of rolling. The maundrils are made of cast-iron, chilled, fitting on like a socket on the end of the bar to a shoulder, and they are secured by a screw nut, so that they are easily removed when required.

The motion of the rolls is so arranged, by a reversing clutch on the shaft, that as soon as the axle cylinder has been drawn clear through, the motion is reversed, and the axle, which has been drawn on to the maundril-rod, is again drawn back through the same opening in the rolls; it is immediately passed through the next smaller groove of the roll with a decreased size of maundril, and again reversed back through the same groove in a similar manner, and so on through a series of grooves in quick succession, each decreasing in size, and consequently increasing the compression and strength of the iron of which the axle is formed, and by the last groove it is passed through it is reduced to the proper diameter. At each time it is changed from one groove to another, the axle-cylinder is turned by the workman a quarter round, so as to equalise the pressure on every part of its surface, to insure uniformity of the compression of the iron, and thoroughly complete a sound welding throughout every part of the axle.

The specimens before the meeting will show the soundness and perfection of the manufacture, as a proof of which, in every test applied, either by blows on the outer surface, or by an immense splitting pressure, by driving a maundril in the interior, there has never been found in any one instance a failure of the weld, although the test has been applied to pieces cut off the extreme end, where it might be supposed the welding of the cylinder of the axle from various causes would not have so good a chance of being perfect.

The axle at this stage, after being welded and drawn down in the rolls to the required size, is taken at once to a hammer, where it is planished between semicircular swages over its entire surface. A small jet of water plays upon it during this process, which enables the workman to detect at once, by the inequality of colour, any unsoundness in the welding. From the hammer it is taken to the circular saws, where it is cut accurately to the length required, and ready to have the bearings formed upon it.

On coming from the hammer, the axle is found to be perfectly clean both inside and outside, the scale being entirely removed. The ends are then reheated, and gradually drawn down by a hammer to the proper dimensions and form of the journals, a maundril being inserted in the end of the tube during the process of hammering.

The formation of the journals can also be produced by a rolling-machine, constructed of tables the entire length of the axle, rolling transversely, each table being a duplicate of the other, and matrixes of the axle when finished. Or in another way, by two sets of rollers, each set consisting of three rollers running vertically, being of the same diameter, and driven at the same velocity, formed exactly to the shape of the bearing, and set the proper distance apart from shoulder to shoulder of the journals.

There can be no doubt that the hollow axles, as now manufactured, are much superior to any yet produced.

As an illustration of the saving in dead weight, take for instance a railway employing 15,000 wagons and carriages, and assume each of these vehicles to run on an average 10,000 miles per annum. The weight of two axles of the solid description finished, say 5 cwt., and if replaced with hollow axles of equal strength, the weight per vehicle may be reduced 1½ cwt.; this taken over one mile of the above stock per annum will be 11,250,000 tons; and

assuming the cost of traction for locomotive power at ½d. per ton per mile, the saving will amount to £11,700 per annum, without taking into account the other advantages, and also the saving to the permanent way, &c.

LIGHTNING CONDUCTORS.

To the Editor of the Mechanics' Magazine.

SIR,—Having read with much pleasure the decision arrived at by the Franklin Institute as to the inefficacy of Armitage's Magnet Lightning-conductors, reported in the *Mechanics' Magazine* of last week, I would offer a few remarks with reference to some points not alluded to by the Committee in their verdict. They say they do not believe that the magnet is in the least more efficient in effecting a discharge from the cloud than an ordinary metallic point. Of course this can only refer to the peculiar arrangement described, as it should be well known that *every* metallic rod, such as an *ordinary* lightning-conductor, becomes temporarily magnetised upon the approach and during the continuance of an electric storm —either by *induction*, or by the passage of electricity through it to the earth; and there is little doubt that any magnetism naturally so produced, would to some extent facilitate the absorption, and aid the discharge of electricity from the cloud.

For this very reason, however, any apparatus on Mr. Armitage's plan must defeat its own ends, as the mere passage of a strong charge of electricity through a permanent steel magnet would in a moment demagnetize it; and as *any* metal becomes temporarily magnetic when so placed in propinquity to a thunder-storm, it is far better to use a *copper* rod than to introduce a permanent magnet of *steel*, which opposes ten times greater resistance to the passage of electricity than the former, and consequently offers far less inducement to the electricity to select a conductor so formed in order to pass to the earth, especially since the integrity of the conductor is lost through the want of a perfect *metallic connection* between the parts.

The electrical tension of the atmosphere during such storms continually varies; and hence, supposing any inducement to discharge is offered by *one* pole to a cloud surcharged with *positive electricity*, it would become necessary to turn the other pole to a cloud in a negative condition,—and a a registering apparatus for atmospherical electricity becomes necessary to indicate the moment of change,—and a magnet of *great length* would have to be employed, fixed perpendicularly, rather than horizontally, as proposed by Mr. Armitage, as otherwise any effect exercised by the one pole would be nullified by the propinquity of the other; and the equi-distance of *both*, electrically speaking, from the cloud. But such an apparatus is *naturally* carried out by the inductive power manifested when a storm approaches an ordinary lightning-rod, which becomes magnetized temporarily, and in that degree and manner best adapted to aid a discharge of equalization between the cloud and the earth.

I would conclude with a few remarks on the formation and fixing of a lightning-rod. One of the best conductors—say copper—should be chosen, care being taken that the portion of the rod actually fixed to the building is *greater* in *cubical capacity* than any section of the striking apparatus, whether points or balls, above, in order to prevent the electricity from leaving the rod after having once entered it. The rod, where attached to the building, should be well insulated either by a coating of gutta percha, painted, or by an insulator of glass or earthenware, such as is shown in fig. 1, in

Fig. 1.

which *a* is the lightning-rod, *b*, building to which it is attached, *c*, glass insulator, fastened by a hook to the wall, with insulating sheds both above and below between the hook and the rod. The metal earth-plate connected to the bottom of the rod should be *large*, and buried at a depth or in a position to insure the conductibility of the surrounding earth; and as *moisture is essential*, an apparatus, such as represented in fig. 2, in connection with the bottom of the

rod, would prove advantageous. In this figure, *a* is the lightning-rod, connected to the earth by plate *b*—some coke being around

Fig. 2.

the plate, *c*, bucket, with funnel leading to the earth-plate—into which a little water should be poured on the approach of a storm. *Points* diverging from a hollow sphere of metal, I believe, form the most effective apparatus for receiving the discharge from the cloud.

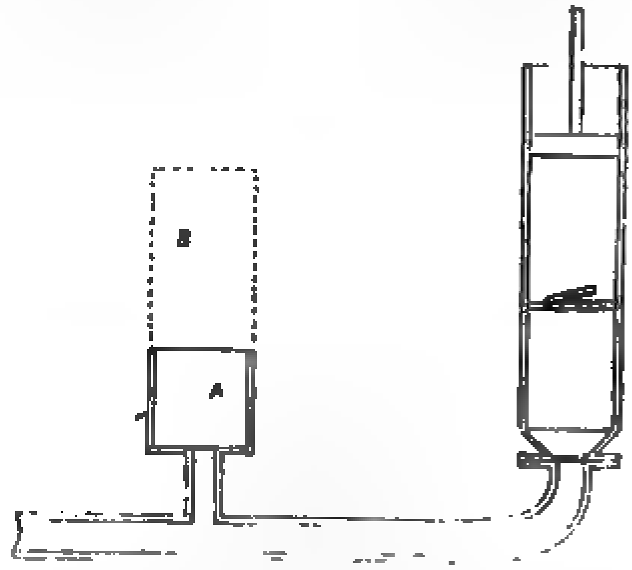
I remain, Sir, yours, &c.,
EDWARD B. BRIGHT.

Liverpool, Sept. 18, 1853.

AIR-VESSELS TO SUCTION-PIPES.

To the Editor of the Mechanics' Magazine.

SIR,—In a recent Number of the *Mechanics' Magazine*, I saw a communication respecting pumps which have a pipe for conducting water from a distance. Ordinary pumps of this description, and especially where there are angles in the conducting-pipe, do not deliver the usual quantity of water, unless the bore of the pipe be wide in proportion to the cylinder of the pump. This arises partly from the friction, and partly from the interrupted flow of the water; so that when the piston is raised with ordinary quickness, the vacuum produced in the cylinder is not occupied by the water with sufficient rapidity. In order to prevent this, as well as some other evils, your correspondent (if I understand the thing rightly) attached a six-gallons vessel to the pipe, somewhere below the lower valve of the pump, as at A; and when he commenced pumping, just as one might expect, the water rose into the reservoir, A, and (I suppose) displaced the air. But he states, that when he continued pumping the water partially left the reservoir, though he was never able entirely to exhaust it. Now I cannot see on what principle the water would leave the reservoir, A, unless the air remained in the reservoir, and acted upon the water by its elasticity. If we suppose the reservoir



above the lower valve, as at B, then the water might descend by its own gravity when the piston was raised; but I very much question whether the reservoir, B, could ever be filled by the act of pumping. If however any means can be devised to keep up a constant flow of water through the conducting-pipe, a very great advantage would be gained; but as experiments, without correct theory, are but hazardous things, a full discussion of the subject either by some of your able correspondents or by yourself, might confer a great benefit.

HYDRAULICUS.

NORTON'S BLASTING CARTRIDGE.

CAPTAIN NORTON has lately effected a further improvement in his Percussion Cartridge by dispensing altogether with the steel or iron pin previously employed. He states that when used as a submarine missile in its present modified form, it will require no greater pressure to explode it, and produce a breach in a man-of-war's bottom, than the rush of a tide, or the lifting of a wave would produce. The inventor intends to forward specimens of his invention to the New York Exhibition, as it will be especially useful in clearing the great forests of America. It is understood that experiments are to be performed with the cartridges in the presence of the Lords of the Admiralty, during the stay of the channel fleet at Cork.

The following extract from the *Cork Southern Reporter* contains the last particu-

lars that have reached us respecting the invention:

"After a series of experiments it is found that, for blasting rocks, it is best to place over the powder charge a plug of deal of the same diameter as the bore, and about three or four inches long, having its lower end hollowed out for about an inch and a half, and of a cone form, a broad-headed iron tack or nail is fixed in the centre of its upper end, the lower percussion cap of the short cartridge rests on the head of this tack; the length of the short cartridge is about a quarter of an inch more than the diameter of the bore, and the fire from the short cartridge is sure to pass between the sides of the plug and the rock, and to fire the powder charge below the plug or wooden tamping. In blasting timber, such as the large roots of trees, no plug or tamping is necessary; the percussion pill-box is in this case used instead of the short percussion cartridge, the iron rammer fitting air-tight, doing the duty of a tamping. The iron or steel pillar is no longer used in forming the cartridge or blasting charge. In using the short percussion cartridge, a *blow* is required to ignite it, but in using the percussion pill-box a *crush* is sufficient to ignite it. In this latter case a plank of timber, raised at one end about four inches above the head of the iron rammer, and then allowed to fall on it, will fire the percussion mixture, and explode the blasting charge."

SIR W. R. HAMILTON'S "QUATERNIONS."

(*Continued from page* 229.)

In the third, fourth, and fifth lectures, the operations of multiplication and division of directed lines are pursued to further results, of which we shall notice one or two of the most striking. The first is, that the multiplication of the expression for any line by the expression for one at right angles to it, will give the symbol for a third line at right angles to both, its length being expressed by the product of the numbers expressing the lengths of the two factor lines. Thus, using the notation already introduced, the product of the two lines $2i\times 3j$ is proved (?) to be the third line $6k$. And the equation $2i\times 3j=6k$ is written down to be henceforward used as an established theorem. Here we labour under some doubt as to whether Sir William Hamilton intends us to regard the process, which introduces this equation to us, as a demonstration or an assumption of the same. But the appearances of assumption seem, certainly, to preponderate, and yet the confident air which marks it is that of demonstration. Perhaps we do not fully understand it; for we can, in no way, discover a means of connecting it with preceding principles; and without the author's assistance should never, from our knowledge of the said principles, have arrived at its result. The immediately accessory equation

$$ij=k$$

has a meaning which, we think, would lead the uninitiated to a very different conclusion. Such a person's reasoning would take some form like this: the line, i, multiplied by the line, j, means i turned right-handedly round j, through a right angle; now the *length* of the axis of rotation cannot affect this, therefore the line $2i$ multiplied by the line $3j$, meaning, as it appears it must, $2i$ turned right-handedly round $3j$ through a right angle, will give us as result $2k$. But no; this won't do. The multiplier, $3j$, is broken into two factors, 3 and j (how lawfully let the reader judge), and then we have

$$\begin{aligned}2i\times 3j&=2i\times 3\times j\\&=6i\times j\\&=6ij=6k\end{aligned}$$

We are by this time, however, somewhat accustomed to these varied interpretations attached to the same or similar symbols. The arbitrary nature of this will appear in another way. The multiplication of two definite lines in space, we might reasonably expect to receive the same geometrical interpretation, whatever be the unit of length, in terms of which we think it convenient to represent them. But in this system the product of two such lines varies inversely as the said unit of length! Let us in one case take a yard as the unit of length, then the symbols i, j, k, will denote three lines, of each of which the length is a yard, and their directions of course at right angles to one another. In this we have

$$i\times j=k$$

That is, the line i, a yard long, multiplied by the line j, also a yard long, = the line k, a yard long. But how would this be if we take a foot as the unit? Why, we shall have for the product of the same two lines, which will now be denoted by $3i$ and $3j$, the line $9k$, which is three yards long! This seems very ungeometrical.

The second very remarkable theorem which is demonstrated (?) here is, that the quotient of two directed lines in space is a *natural* Quaternion. To reconcile this with the previously-given definition of this quotient, will puzzle many readers of these Lectures (should there ever be such); for if we adhere to that definition, it is, certainly, not true. If it be taken to express the direction and length of the line, β, in rela-

tion to a *known* line, α, it would naturally depend on a system of three numbers only, and would be a natural *triplet*, and *not* a Quaternion; the plane of the two lines would evidently be determined by one number (since α is already known), the relation of their lengths by another, and the angle between them by a third. But in order to make this quotient appear a Quaternion, Sir William Hamilton has supposed it to determine one element of the line, α, as well as the relation of β to α. This is one among many instances in which we cannot help thinking that our author has imposed *too much* upon his symbols. As a last example of this, let us give the eel-like interpretation which is attached to the compound symbol, $i\ j\ k$, and by which it is brought to mean, -1. Viewing i, j, k as three "versors," their composition may very properly be said to have the same effect as -1; and it being *desirable* that they should, when so compounded, be equivalent to this "inversor," they are so interpreted. But since as three pure "versors" they can never appear in Quaternions in connection with a *number only*, the first of them at least must be taken to mean a line; so we must interpret i, j, k in this way, the line, i, acted on by versor, j—, this gives the line, k, which has now to be multiplied by k (meaning doubtful); but it has been seen that when k is taken as a versor,

$$k \times k = -1,$$

and so it is expected that the student will conclude, with the author, that it is lawful to write the equation,

$$i, j, k = -1\,!!$$

This, we think, very few students will be disposed to do.

It would be useless for us to follow the author into the further results obtained, in their way, by the multiplication and involution of lines and Quaternions, in the development of which these questionable proceedings are reproduced compounded and multiplied, and are therefore proportionally the more objectionable. Let us, however, reflect on the contrast between all this and what one is led to expect on first opening the book. On the first page of the preface we find the following:

"The difficulties which so many have felt in the doctrine of negative and imaginary quantities in algebra forced themselves long ago on my attention; and although I early formed some acquaintance with various views or suggestions that had been proposed by eminent writers, for the purpose of removing or eluding those difficulties (such as the theory of direct and inverse quantities, and of indirectly correlative figures, the method of constructing imaginaries by lines drawn from one point in various directions in one plane, and the view which refers all to the mere play of algebraical operations, and to the properties of symbolical language), yet the whole subject still appeared to me to deserve additional inquiry, and to be susceptible of a more complete elucidation. And while agreeing with those who had contended that negatives and imaginaries were not properly quantities at all, I still felt dissatisfied with any view which should not give to them from the outset, a clear interpretation and meaning; and wished that this should be done, for the square roots of negatives, without introducing considerations *so expressly geometrical*, as those which involve the conception of an angle." Having read this, we certainly were not prepared to see difficulties multiplied one upon another in the way we have witnessed. We might reasonably look for clear and consistent elementary principles to be brought forward in the new calculus. But instead of finding the difficulties of common algebra annihilated, we find them increased, and new and strange ones added to the list. For what difficulties have we in ordinary algebra at all to be compared to those we meet with in the multiplication of two Quaternions? In which, if we accept the meaning which this system assigns to the product, $i\,x \times i\,x'$, we do not know how to accept that given to, $i\,x \times j\,y'$, and *vice versâ*, if we are willing, with all its faults, to adopt the latter, we immediately "break down" at the former. And then again though real meanings are given to the square roots of negatives of one kind, yet involved in the operations with these we have square roots, which like the ordinary symbol $\sqrt{-1}$ are only to be interpreted as imaginaries, to which no *tangible* meaning can be attached; as indeed, we cannot but think is absolutely certain to be the case wherever we deal with positive and negative numbers. Sir W. Hamilton has, we suppose, altered his views since he thought as above, though he does not tell us so.

A word or two on the "geometrical and physical theorems" to which the author has been conducted by the present "calculus;" and then, we hope, we shall have said sufficient to enable our readers to form a safe judgment as to whether it would be prudent for them to give their time and energies to the study of a calculus, which has first principles apparently so unsound, and yet results so true and so new as this is said to have.

Of these the author speaks in the introduction of his subject to his audience:—"I am not aware that any one has hitherto professed to detect error in any of these geo-

metrical and physical theorems, to which this method has conducted me, while yet I cannot but perceive it to be the feeling of several persons among my mathematical friends and acquaintances, that in the existing state of my own published views upon the subject, some degree of obscurity still hangs over its logical and metaphysical principles; so that the admitted correctness of the results of this new calculus may appear, even to candid and not unfriendly lookers-on, to be, in some sense, accidental rather than necessary, so far as the conceptions and reasonings have hitherto been formally set forth by me."

We cannot avoid feeling what, we think, the friends and acquaintances of Sir William Hamilton must still feel, that even now, though some eight hundred pages of large dimensions have been printed on the subject, that, even now, some *dense clouds* hang over its "logical and metaphysical principles." Whether the said clouds belong necessarily and essentially to the said *principles*, or are mere optical illusions, we of course shall not decide. But trusting to what we have before said for proof of their reality, we cannot help expressing our excessive astonishment at what we find here represented as a fact, and what seems to be such; namely, that such principles lead to any correct results, much more that they should invariably conduct to theorems in which no one has pretended to discover any error. We can only say, that if they do not lead to error they certainly ought to do so, wherever they are involved. And we are obliged to conclude that no result has been published which could not be interpreted by force to mean some theorem, already known, or that could be readily verified in some independent way; any result which could not be so interpreted being regarded as caused by some clerical error in the process leading to it, rather than as arising from anything wrong in the principles. It must be remembered that many of the theorems proved in these Lectures are acknowledged to be, and evidently are, entirely independent of the peculiar principles of the Quaternions; and we believe many more are actually, if not apparently, independent of any of the peculiarities against which we have been obliged to raise objections. Whenever throughout a process of investigation no symbols are used in one invariable sense, as they seem to be *sometimes* in the lectures on Quaternions, we may be enabled to place some confidence in the conclusion; but when the same symbol means sometimes one thing, at other times another, we must be allowed to treat the proceeding as a suspicious one, and not commit ourselves to its caprices; and in any result which we have no means of establishing by the processes of ordinary algebra and geometry, we must be excused from placing any confidence, as it seems to us it must depend for its correctness upon whether the incongruous elements of the present theory do or do not neutralise and eliminate one another in the investigation on which the said result is founded. Even when this investigation is conducted by the author himself we must say this; but what if we attempt to use the calculus for ourselves? Why we think it would in our hands (and in the hands of any but their originator) be morbidly prone to error. And it must be remembered that it is to enable the reader to become capable of using and applying the method for himself that the Lectures were written, if they have any legitimate object at all; for indeed the proper object for which any book should be written is to instruct and benefit the reader, and so obtain his gratitude and sympathy, and not to prove the learning, the genius, or the industry of the author, and thereby to beget the admiration and the wonder of the reader. What is it to us, or to any reader, if the book before us prove that Sir William Hamilton has laboriously and even successfully investigated and solved problems, soluble by no other means, by a method which he has called the Calculus of Quaternions, the elements of which he here professes to expound, if *these* are such as no man in his senses can accept? We have some tribute of respect for any person who enlarges the boundaries of human knowledge, even for himself alone, but we have still more respect, and much more gratitude, for the person who enables us to enlarge and extend our own; and this is true of every one.

Now, in conclusion, having set forth some of the principal difficulties on which the student, who is desirous of the benefit of the experience and invention of the author, will not fail to stumble, and which will disappoint him as he finds the system is built on so insufficient a foundation, let us hope that whatever is correct and important in it may be capable of a better groundwork, and will receive it.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

George Collier, of Halifax, York, engineer. *Improvements in machinery or apparatus used in weaving.* Patent dated March 10th, 1853. (No. 611.)

Claims.—1. A mode of arranging, combining, and working parts forming a self-acting temple.

2. The arranging tappets or other apparatus working leaves of heddles, so that one in each pair of heddles may in passing the centre for the change of shed precede the other.

3. The so arranging parts in connection with weaving apparatus, that when any of the warp-threads break, the ends of such warp-threads may be withdrawn, to avoid entanglement with other threads or with the harness.

4. The application of a brake acting internally of the driving-pulley or other rim, and brought into action directly from the stop-rod.

5. A mode of combining and arranging the parts which work the jacks or levers for working the healds or heddles.

The Hon. WILLIAM ERSKINE COCHRANE, of Albany-street, Regent's-park, and WILLIAM MARSHALL COCHRANE, of Kingston, Surrey, Esq. *Improvements in girths or pads for retaining saddles in their places.* Patent dated March 10, 1853. (No. 612.)

These improvements consist in applying a strong sheet India-rubber spring beneath the upper part of the pad of webbing to which the girth is attached. The India-rubber spring comes on the ridge of the horse's back, and the saddle is retained in position by hooks on the pad in which the front of the panel is placed.

FRANCIS PRESTON, of Manchester, spindle and flier-maker. *Improvements in the manufacture of bobbins and spools.* Patent dated March 11th, 1853. (No. 616.)

This invention consists in manufacturing bobbins and spools of malleable cast-iron, or other cast metals, instead of wood or wrought metal, as hitherto customary.

JAMES SUMMERS, of the firm of James and Joseph Summers, of West Cowes, Isle of Wight, sail-maker. *Improvements in certain kinds of sails.* Patent dated March 11, 1853. (No. 617.)

The invention relates to the mainsails of cutters, sloops, schooners, &c., and to fore-and-aft sails generally, and consists in constructing them so that there shall be a diagonal line of junction of the parts thereof from the throat at the head of the sail to the clew at the foot of the same, the lengths of cloth running from each side of this line of junction, one part in lines proceeding direct from the mast, and the other part in lines proceeding from the junction-line to the leech of the sail, instead of in direct lines from the head to the foot of the sail, as hitherto practised.

MOSES POOLE, of Avenue-road, Regent's-park. *Improvements in apparatus for serving oysters and other shell fish.* (A communication.) Patent dated March 11, 1853. (No. 619.)

This apparatus is designed to allow the water to flow freely away from the oysters. It consists of a series of perforated trays or galleries placed one above the other, on which the oysters are served; these trays revolve round a central axis which is supported in a tray, into which the water which runs from the oysters flows.

PETER ARMAND LECOMTE DE FONTAINEMOREAU, of South-street, Finsbury. *A new or improved apparatus for filtering liquids.* (A communication.) Patent dated March 12, 1853. (No. 622.)

The nature of this apparatus will be readily seen from the following claim:

The construction of apparatus for filtering liquids by the use of tubes or vessels of felt, or other flexible filtering material or fabric, supported internally by coils or frames of wire or other suitable material.

AUGUSTE EDOUARD LORADOUX BELLFORD, of Castle-street, Holborn. *Improvements in machinery for cutting standing crops and gathering the same into sheaves or bundles.* (A communication.) Patent dated March 12, 1853. (No. 624.)

Claims.—1. A rib or projection on the under side or surface of each cutting tooth, for the purpose of preventing the teeth being clogged in the fingers.

2. Giving the endless apron an intermittent motion, for the purpose of carrying the grain, straw, stubble, &c., back and depositing it in suitable quantities to be bound into sheaves, or bundles.

3. Certain collecting hooks, for the purpose of collecting the grain, straw, stubble, &c., together into the form of sheaves or bundles ready for binding.

4. The combination of the collecting hooks, and intermittently moving carrying-apron.

NICHOLAS AUGUSTE EUGENE MILLON, and LEOPOLD MOUREN, of Algiers, Africa. *Certain improvements in the treatment of corn and other grains, and more especially in all that concerns washing, drying, grinding, curing and preserving them.* Patent dated March 12, 1853. (No. 625.)

The object of this invention is to expel from grain the moisture absorbed during the washing process, and also a portion of that naturally contained in it, so as to reduce the amount present to a uniform per centage. This is accomplished by the use of a hot-air stove in conjunction with that of the centrifugal machine, by which means the grain is prepared in a manner that renders it better adapted for the production of flour than when treated in the ordinary manner.

THOMAS EVANS, the younger, of Tooley-street, Southwark, cornfactor. *Certain improvements in the construction of steam-boilers.* Patent dated March 12, 1853. (No. 626.)

These improvements are stated to be applicable to heating apparatus generally, as

well as to steam-boilers. They consist in making the surface in which the flame from the furnace acts with deep longitudinal corrugations or chambers, so that the water is exposed in small quantities to the action of the heat, and evaporation consequently proceeds rapidly.

GEORGE MICHIELS, of Holywell-street, Westminster. *Improvements in obtaining oxygen for manufacturing purposes.* Patent dated March 12, 1853. (No. 627.)

This invention is based on the fact, that baryta in various forms possesses the property of absorbing oxygen at certain temperatures, and again surrendering it when the temperature is changed.

Claim.—The use of the earth baryta in the production of oxygen for manufacturing purposes by the application of heat.

THOMAS HUNT, of Leman-street, Goodman's-fields. *Improvements in the construction of sights for fire-arms.* Patent dated March 12, 1853. (No. 628.)

The invention consists in mounting the sight on a ball and socket, or universal joint, in arranging it to be moved laterally by a screw, in order to get adjustment, and also in engraving the scale on a moveable and adjustable surface, instead of on the fixed sight, by which arrangement the sight can be adjusted with great nicety.

THOMAS RHODES, of Regent-works, Leeds. *Improvements in the manufacture of manure.* Patent dated March 12, 1853. (No. 629.)

This invention consists in producing manures by reducing wool or hair into a finely divided condition or pulp by machinery, and then treating this pulp with acid or alkali to dissolve it, and, when drained, mixing charcoal, coprolites, &c., with it, and moulding the mixture into blocks.

RICHARD CHRISTOPHER WITTY, of Portland-place, Wandsworth-road. *Improvements in the manufacture of gas.* Patent dated March 12, 1853. (No. 630.)

This invention consists in combining oils with vegetable matters, and moulding the mixture into bricks, which are then dried and distilled in order to produce gas. The distillation is performed in a retort, divided horizontally into two compartments, the bricks being placed in the lower one, and the products passing away through a perforated block in the upper one, the heat of which ensures that none of the products shall pass away without being converted into gas.

JAMES MURDOCH, of Staple-inn, Middlesex. *An improved construction of portable voltaic batteries.* (A communication.) Patent dated March 12, 1853. (No. 631.)

Claim.—The forming the elements or links constituting chain voltaic batteries of two bent strips of different metals attached to, and nearly enclosing the sides of a piece of suitable absorbent material, the several links or elements being connected with each other by passing a loop or bow of one link through the loop or bow of the opposite metal in the next link without any intermediate connecting piece.

WILLIAM EDWARDS STAITE, of Manchester, gentleman. *Improvements in apparatus for producing and applying current electricity, parts of which apparatus are applicable for obtaining and treating certain chemical products resulting from electrolytic action.* Patent dated March 14, 1853. (No. 634.)

Claims.—1. Certain specified improvements in electric lamps.

2. A mode of treating and preparing carbons or carbonaceous compounds for electrical purposes.

3. A mode or modes of connecting articles made of carbon or carbonaceous compounds with metals, for the purpose of producing and maintaining a more perfect contact between them.

4. The use of sheets of platinum gauze, to form the electro-negative elements, having metallic conductors attached thereto.

5. The construction of the cells of galvanic batteries with tubes at or attached to their bottom, combined with certain means whereby the same are charged and discharged.

6. The employment of plates composed of lead alloyed with other metals more positive than lead, as positive elements in galvanic batteries, with any suitable solution.

7. An electric tell-tale or alarum.

JOHN SCOTT, junior, of Greenock, Renfrew, engineer. *Improvements in the treatment or manufacture of animal charcoal.* Patent dated March 14, 1853. (No. 639.)

Claims.—1. A general arrangement of kilns, ovens, or furnaces for the treatment or manufacture of animal charcoal.

2. The system of treating or reburning animal charcoal, wherein the burning and refrigerating or cooling processes are simultaneously and continuously carried on, and without atmospheric exposure or the use of water.

3. The application and use in charcoal-kilns or ovens of secondary closed cooling tubes or refrigerators, capable of being connected to, and disconnected from the retorts.

4. The system of arranging and constructing charcoal kilns wherein each retort or burning tube has connected with it a close refrigerating or cooling tube.

WILLIAM STEVENSON, of Johnstone, Renfrew, North Britain, manager. *Improvements in the treatment or manufacture of textile materials.* Patent dated March 14, 1853. (No. 640.)

This invention consists of an apparatus for clearing threads from knots and adherent matters. It is composed of two slotted plates laid one upon the other, with the slits coinciding so that the threads are enabled to pass freely through, but the knots are stopped by the edges of the slits. The plates are adjustable with respect to each other, so that a greater or less aperture for the threads can be obtained according to their size.

WILLIAM BASHALL, junior, of Preston, Lancaster, cotton-spinner. *Improvements in dressing, sizeing, and tape machines.* Patent dated March 14, 1853. (No. 641.)

Claims.—1. A general arrangement of mechanism to be used in dressing, sizeing, and tape machines.

2. The system or mode of treating or preparing warp threads or yarns with oil or oleaginous or greasy matters, for the purpose of softening the same.

3. The application and use in dressing, sizeing, or tape machines, of oleaginous or greasy matter, for the preparation of warp threads.

WILLIAM MORGAN, of Spencer-street, Shoreditch, chair-maker. *The manufacture of a portable double-action folding chair.* Patent dated March 15, 1853. (No. 642.)

The seat of this chair is moveable, and the seat-frame is hinged, so as to fall down and rest upon the back legs, the front part being hinged also, so as to fold up on the outside of the back legs in a parallel line with them. When arranged for use, the seat of the chair is fastened by two tension-rods fitted into the back rails and passing through the seat-frame into two nuts in the front part. The rods are screwed up by a key, and the screw-holes are hidden from view by a slip-rail. This mode of construction is applicable also to elbow-chairs, in which case the elbows would be fastened by means of thumb-screws through the back legs and side rails.

THORNTON JOHN HERAPATH, of Bristol, analytical chemist. *Improvements in treating sewage and in manufacturing manure therefrom.* Patent dated March 15, 1853. (No. 643.)

This invention consists in causing the phosphoric acid and ammonia of sewage to be precipitated in a comparatively insoluble state by the addition of magnesia or a magnesian compound, at or about the same time as the deodorization of the said sewage is effected by the addition of some deodorizing chemical agent which will not decompose ammonia or its salts.

FRANCOIS DURAND, of Paris. *An improved kind of loom.* Patent dated March 15, 1853. (No. 645.)

In this loom the shuttle receives a circular movement through the sheds opened in the warp, which is raised and lowered by harness in the usual way.

Claims.—1. The circular loom described, this loom being especially characterized by the circular movement of the shuttle.

2. The arrangement of the same loom also described for manufacturing ribbons, and other striped tissues, of one or many colours.

3. An apparatus serving for the manufacture of bobbins of a new form, which may also be applied to the shuttles of looms with a batten as well as to those of the circular loom.

JOSEPH MAUDSLAY, of the firm of Maudslay, Sons, and Field, of Lambeth, Surrey, engineers. *Improvements in screw propellers for ships and other vessels.* Patent dated March 15, 1853. (No. 646.)

This invention relates to improvements on the feathering screw propeller, patented by Mr. Maudslay, March 8, 1848. The improvements are of considerable practical value, and we therefore reserve a description of them for our next Number, when we shall also give engravings of the arrangement.

EPHRAIM SABEL, of Broad-street-buildings, merchant. *Improvements in the construction of looking-glasses, and the apparatus connected therewith.* (A communication.) Patent dated March 15, 1853. (No. 648.)

The nature and object of this invention will be readily seen from the claim, which is,

The placing, by mechanical means, two plates or sheets of looking-glass in framing so as to have the appearance, when not in use, of a single looking-glass; and when separate or apart, and in position, showing or reflecting the human form, when it is placed in the interval between such plates or glasses, both before and behind or back and front at one view.

GEORGE KNIGHT, of Birmingham, gentleman, and JOHN HERITAGE, of Warwick, builder. *An improvement or improvements in drying bricks and such other articles as are or may be made of clay.* Patent dated March 16, 1853. (No. 649.)

Claim.—The application of steam and hot water to the heating of kilns, ovens, flues, or chambers in which bricks and other articles made of clay are dried prior to the burning of the same, whether the said steam and hot water be applied as described, or in any other manner.

JOHN VANDEN HEILAKKER, of Brussels, Belgium, mechanical engineer. *An improved eccentric engine applicable to the purposes of general navigation.* Patent dated March 16, 1853. (No. 650.)

The complete specification was filed at the time of application.

"My system," says the patentee, "is founded upon the application of eccentric force, and by such eccentricity I obtain the means of plunging the paddle-floats into the water in a vertical position, and of withdrawing them in the same manner;" or, in other words, the floats dip and rise vertically, making their stroke horizontally.

Claims.—1. The application of eccentric movement or motion to propelling vessels at sea, in rivers, lakes, or other waters.

2. A particular combination of parts by which the paddle or floats are caused to enter and leave the water in a vertical or perpendicular position.

CHARLES HEARD WILD, of St. Martin's-lane, civil engineer. *Improvements in fishes and fish-joints for connecting the rails of railways.* Patent dated March 16, 1853. (No. 651.)

Claims.—1. The constructing fishes for connecting the rails of railways with a groove adapted for receiving the heads of the bolts or rivets employed for securing such fishes, and the application of such fishes for connecting the rails of railways.

2. The constructing fish-joints for connecting the rails of railways by means of fishes applied to the joints of divided or split rails.

3. The constructing fish-joints for connecting the rails of railways with fishes secured by three or more bolts and nuts or rivets, of which the central belt or bolts, or rivet or rivets, is, or are, of greater diameter than the extreme ones.

4. The constructing fish-joints for connecting the rails of railways with grooved fishes fitted to the sides of the rails, and secured to them by bolts and nuts or rivets, and having projecting wings firmly secured to, and resting upon, the sleepers or bearers, so as to support the rails by their sides and upper flanges.

5. The constructing fish-joints for connecting the rails of railways with rails and fishes, having the touching surfaces of one or both of them planed as described.

WILLIAM MALINS, of Saville-row, gentleman. *Certain improvements in the application of atmospheric propulsion upon railways.* Patent dated March 16, 1853. (No. 652.)

These improvements are particularly calculated for those atmospheric railways upon which numerous stations and frequent stoppages of trains are required.

Claim.—The division of the traction tube into lengths, separated by air-tight partitions, such lengths being brought into communication with the exhaustion or vacuum tube as the carriages travel from station to station.

HENRY RICHARDSON FANSHAWE, of Arthur-street, Old Kent-road, chemist and manufacturing agent. *Improvements in fire-arms.* Patent dated March 16, 1853. (No. 653.)

These improvements consist in the substitution of the electric or electro-galvanic fluid as a means of igniting the powder or other explosive compounds employed in fire-arms in place of percussion caps, flint, or match. The battery is carried in the stock of the gun, or the carriage of field-pieces, mortars, &c., and the charge is ignited by the wire in connection with the battery being carried into it by a spring, or otherwise brought into contact with it.

SAMUEL COLT, of Spring-gardens, gentleman. *Improved apparatus for heating and annealing metals.* Patent dated March 16, 1853. (No. 654.)

Claims.—1. A particular construction of annealing furnace or oven, and especially the application of a tube to the box containing the metal to be operated upon, by which means the progress of the operation may be observed.

2. A peculiar construction of smith's forge, whereby anthracite coal may be burned in an open fire, and the metal to be heated may be kept in sight of the workman.

JOHN OLIVER, of Newcastle-on-Tyne, manufacturing chemist. *Improvements in the manufacture of a red pigment, commonly called Venetian red.* Patent dated March 16, 1853. (No. 655.)

The patentee claims—

1. Certain combined means of manufacturing Venetian red.

2. The decomposing of sulphate of iron by magnesia, and applying the hydrated oxide of iron so obtained to the manufacture of Venetian red (by mixing it with gypsum, drying and calcining the mixture in close retorts.)

EDWARD NICKELS, of the Albany-road, Camberwell, gentleman. *Improvements in preparing lubricating matter.* (A communication.) Patent dated March 16, 1853. (No. 656.)

This invention consists in combining India-rubber and gutta percha by heat with oils and fatty matters, with or without tar or bituminous matters, and using such preparations as lubricating matters.

JOHN LIVESEY, of New Lenton, Nottingham, draughtsman. *Improvements in pile and looped fabrics, in cutting and finishing such fabrics, and in the machinery employed therein.* Patent dated March 17, 1853. (No. 657.)

This invention relates to the production of ornamental piled fabrics, of any design or pattern, by cutting a portion of the loops

of terry fabrics, and leaving other portions of them uncut.

WILLIAM BLINKHORN, of Sutton, Lancaster, glass manufacturer. *Certain improvements in the construction of furnaces and annealing kilns employed in the manufacture of glass.* Patent dated March 17, 1853. (No. 659.)

Claims.—1. A peculiar construction of furnace for melting or fusing the metal, especially distinguished by a descending-flue at the centre and the pointed form of the roof.

2. A peculiar construction of annealing-kiln, having the floor or bed thereof sunk below the level of the mouth, and having a table or receiver capable of being moved in a lateral direction, and of being tilted or canted over to adjust it to its required position.

GEORGE JOHNSON, of Stockport, Chester, M.D. *Certain improvements in looms for weaving.* Patent dated March 17, 1853. (No. 660.)

This invention consists of an apparatus to be employed in lieu, or in aid of the healds or harness for forming the shed in the warp-threads. It consists mainly of a roller furnished with parallel grooves at the same distance apart as the dents of the reed, and at right angles to the axis of the roller. The warp-threads pass through these grooves and rest against certain thread-lifters, there being two of these in each groove, and those of one groove at right angles to those in the next groove. The roller receives rotary motion, and as the threads are held in a state of tension, when the lifters are in a vertical position the threads in the grooves will be raised, and when they are in a horizontal position the threads will be depressed, and thus the shed or opening will be formed in the warp for the shuttle to pass through. The apparatus may also be made to act on the harness instead of directly on the threads.

JOHN BOTTOMLEY, of Bradford, York, manufacturer. *Improvements in the manufacture of figured, or ornamental, piled, or plushed fabrics.* Patent dated March 17, 1853. (No. 662.)

This invention relates to fabrics, the ground of which is composed of alpaca alone or combined with other materials, and which have figured, or ornamented, or piled or plushed surfaces. The improvements consist in making the piled or plushed surfarce of mohair, silk, or cotton alone, or combined with other materials; and also in making such surface of mohair alone, or combined with other materials, of whatever materials the ground may be composed.

PAUL CAMERON, of Glasgow, nautical instrument-maker. *Improvements in marine and surveying compasses.* Patent dated March 18, 1853. (No. 665.)

This invention relates to various improved arrangements connected with the mariners' and surveyor's compass. In order to compensate for the vibrating motion of the compass-card, a brass rod is attached, having a ball at each end, one ball being fitted into a socket in the bottom of the compass case, whilst the other, which is larger, swings upon the rod as suspended from the upper ball as a centre. Again, one half of the compass card is divided into a series of triangles, and the edge of the needle is graduated so that as the needle works over the triangles the distance run as compared with the actual route may be readily seen. The centre of the compass card, or needle, has attached to it a small vertical style, the shadow from which being compared with the dial-tables furnishes a means for at once ascertaining the variation and deviation. The North pole of the compass-box has fixed to it a brass case containing a slip of glass divided into degrees of the tangent, and one of the sides is divided into a line of numbers to give the altitude corresponding to a base line of 100°, which may be increased by multiplying or dividing according to the proportion of the numbers. To the South pole of the compass-box is fixed a small telescope with cross sights, for reading off degrees of altitude and height of objects, so that the compass may be applied in azimuths and altitudes of objects, and for the ordinary purposes of surveying. For the purpose of rectifying, the compass is suspended within a brass ring, the exterior of which is grooved and has a tangent screw working in it, so that by this screw the compass may be set to the magnetic meridian at any time; and to ascertain and adjust the proper dimensions of the copper correcting ring for the oscillations, a solid ring is first taken, and fine copper wire is wound upon it until its density is sufficient for the purpose.

WILLIAM KING WESTLY, of Leeds, flax machinist. *An improved comb or gill for heckling, drawing, roving, and otherwise preparing to be spun hemp, flax, tow, silk, wool, and other fibrous substances.* Patent dated March 18, 1853. (No. 666.)

Claims.—1. A general arrangement of machinery or apparatus for drawing and heckling fibrous material.

2. The application of revolving rings, in conjunction with semicircular guide-plates.

3. The system of constructing duplex gills, or fallers or gills, with two combs, one on each edge of the surface.

4. A system of combing or heckling fibrous materials wherein duplex combs or

gills are alternately traversed forward in action, and returned out of action along a curved guide in the direct line or combination of the forward guide, whereby the gill is reversed at each movement.

JOHN HENRY JOHNSON, of Lincoln's-inn Fields, gentleman. *Improvements in steam-engines.* (A communication.) Patent dated March 18, 1853. (No. 667.)

Claim.—The system or mode of constructing crank-shafts with the cranks in the same plane, or nearly so, for the purpose of reducing lateral strain on the bearings of the main-shaft, and thereby obviating the injurious vibratory or tremulous movement of the machinery.

MALCOLM BAXTER, of Glasgow, Lanark, engineer. *Improvements in steam-engines and pressure regulating valves.* Patent dated March 18, 1853. (No. 668.)

Claims.—1. A general arrangement and construction of steam-engines, and pressure regulating valves.

2. The system of arranging and constructing steam-engines, wherein three or more actuating cylinders are placed with their axes radiating from the crank-shaft centre, and with their piston-rods all working in connection with a single crank; no two cylinders being ineffective at the same moment or point of revolution of the shaft.

3. The application of three or more Woolf's or duplex cylinder expansive apparatus radiating round a central crank shaft.

4. The application of a single eccentric or cam-movement, for actuating the entire series of slide-valves in steam-engines.

5. The system of connecting the radial series of slide-valve rods of steam-engines to one single eccentric.

6. The system of regulating fluid-pressure by admitting such fluid between the opposing areas of a piston or plunger, and a lift-valve.

7. The application of a plunger or piston, and a lift-valve working in connection, for the purpose of regulating fluid-pressure.

RICHARD ARCHIBALD BROOMAN, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, patent agents. *An improved machine for weighing or measuring and packing spices, drugs, coffee, and like matters.* (A communication.) Patent dated March 18, 1853. (No. 669.)

The claims in respect of this machine are,

1. A chain of moulds in combination with packing pistons; and

2. A weighing and feeding apparatus, described.

AUGUSTE EDOUARD LORADOUX BELLFORD, of Castle-street, Holborn. *Improvements in power looms.* (A communication.) Patent dated March 18, 1853. (No. 670.)

This invention comprehends a variety of improvements, the general aim of which is to increase the speed of the loom without giving such shocks or concussions as would injure either the mechanism of the loom or the threads to be woven, and to improve the quality of the fabric produced. The improvements relate; 1. to the harness motion, the object being to open sheds only to the extent required to allow the shuttle to pass through; 2. to the picker-stick motion, the upper ends of the picker sticks being made the pickers for driving the shuttle; 3. to the drawing back of the picker sticks, which is effected by means of wooden springs; 4. to the method of arresting the shuttle when boxing; 5. to the mode of securing the raw hide to the faces of the picker sticks; 6. to the take-up motion; and 7. to the swinging fork of the filling-stop motion.

JOHN HASKETT, of Wigmore-street, Cavendish-square. *Improvements in grinding stone and whetstones.* Patent dated March 18, 1853. (No. 671.)

According to this invention, 25 parts of brown natural gum-lac or stick-lac are to be melted by means of a suitable degree of heat, the liquefaction being aided by the addition of a little lint-oil, being adulterated with litharge if thought desirable; then 100 parts of siliceous sand, of the requisite degree of fineness, are to be added, and the whole mixed carefully together. More or less of the gum-lac or stick-lac may be used, according to the degree of hardness desired. By means of moulds, stones suitable for grinding fine cutlery, scythes, tools, &c., may be formed.

Claim.—The above-described method of manufacturing grindstones and whetstones.

GEORGE ROCK LUCAS, of Dronfield, near Sheffield. *Improvements in the method of raising water and other materials from mines.* Patent dated March 18, 1853. (No. 672.)

According to Mr. Lucas' arrangement, a tank or vessel is introduced under the chair or cradle used for carrying up the materials. In the bottom of this tank is a valve with a rod, having at its upper part a cross bar, so that when this cross bar drops upon the rests at the top of the shaft, it lifts the valve and allows the water to escape. Near the upper part of the shaft is a receiver or trough, which, when the tank has been raised beyond it, is caused to descend under the tank, and receive the water to conduct it away to the drain, when the chair is again lifted from the rests ready to descend the shaft, the receiver falls back into the end of the drain. A reservoir is formed at the bottom of the shaft in which the water is

collected from the workings of the mine, the tank descends into the reservoir, and is filled with water to be raised at the same time that the mineral is loaded upon the chair.

Charles Harratt, of the Royal Exchange, London. *Improvements in strengthening the masts of ships and vessels.* Patent dated March 18, 1853. (No. 673.)

This invention consists in giving strength to masts by stays or tension-rods of iron, brought to act on the masts by studs or props to hold out the stays in a form properly to strengthen every part of the mast. The usual back and fore stays may be used in addition. The iron stays are tightened by means of wedges, so as to be perfectly rigid.

Claim.—The application of stays to masts, as described.

George Mackay, of Buckingham-street, Strand, gentleman. *Improvements in the manufacture of iron.* (A communication.) Patent dated March 18, 1853. (No. 678.)

This invention consists of an improved method of decarbonizing iron ore after it has been through the process of deoxidation, and thereby of reducing it at once from the ore to malleable iron. To effect this, a blast of atmospheric air, cold or hot, is brought upon the ore, regulated according to the state the ore is in and the heat required, the effect of which is to drive out the carbon and other impurities. The blast is brought down upon the ore from above, either at the roof or sides of the furnace as is found most convenient, and thus an intense heat is created upon the right point not unlike the action of a blowpipe.

Claim.—Forcing down upon the iron ore, from the roof of the furnace, in the different stages of the process, as required, and on the different hearths, atmospheric air, either heated or cold, for the purpose of decarbonizing the ore, and bringing the iron to nature, or refining the same; and regulating the degree of heat in a peculiar manner described.

John Eldridge, of Stanley-street, Pimlico, ironmonger. *An invention for washing woollen, linen, cotton, silken, hempen, skin, and flaxen materials and substances, and called the Rotary Washing-machine.* Patent dated March 19, 1853. (No. 680.)

Claim.—The combination of a roller and bars or levers for the purpose of cleaning cloth, skins, woollen, linen, cotton, silken, hempen, and flaxen materials and substances.

Henry Bousquet, of Fenchurch-street, merchant. *Improvements in the manufacture of manure.* Patent dated March 19, 1853. (No. 682.)

This invention consists in manufacturing manure from sugar scum by the processes indicated in the claims, which are,

1. The purification of the scum by its dissolution in water.

2. The mixture of the scum with black bones, lime, burnt clay, or other calcined substance. And

3. The mixture of the whole (by which combination an artificial manure is produced), and the use thereof for agricultural and other similar purposes.

Samuel Radcliffe, of Oldham, Lancaster, cotton spinner, and Knight William Whitehead, of the same place, manager. *Certain improvements in machinery or apparatus for grinding or setting the surfaces of cylinders when employed in carding-engines.* Patent dated March 19, 1853. (No. 685.)

The patentees describe and claim a peculiar form or construction of flexible "strickle," and a method of applying the same, whereby the surfaces of the cylinders and rollers of carding-engines may be ground and set by self-acting means.

Alfred Vincent Newton, of Chancery-lane, mechanical draughtsman. *An improved construction of oil-lamps.* (A communication.) Patent dated March 19, 1853. (No. 686.)

The patentee describes and claims,

A lamp constructed for the purpose of burning resin-oil, the same having an annular elevated reservoir, and a space through which the air is permitted to pass, in combination with an arrangement for throwing a current of air immediately upon both sides of the wick, and with devices for elevating and depressing the wick and button.

James Fraser, of Gracechurch-street, merchant. *Improvements in the manufacture of portable packages.* Patent dated March 21, 1853. (No. 687.)

This invention applies to trunks, boxes, cases, baskets, and packages of a six-sided figure, and consists in constructing them with hinged sides, in such manner that they may be folded so as to occupy little more than the space of their own materials when empty.

William Whitaker Collins, of Buckingham-street, Adelphi, civil engineer. *Certain improvements in looms for weaving.* (A communication.) Patent dated March 21, 1853. (No. 688.)

This invention relates to circular looms for the production of various kinds of articles from warp and weft threads laid alternately or interwoven with each other, and consists in weaving in a horizontal circular plane, by means of two or more wefts; also in a mode of maintaining the tension of the warps and wefts, and in a mode of delivering the manufactured article.

PROVISIONAL PROTECTIONS.

Dated March 26, 1853.

727. Alexander Prince, of Trafalgar-square, Charing-cross, Middlesex. Improvements in carriages. A communication.

Dated August 9, 1853.

1855. William Baines, of Coverdale-terrace, near Birmingham. Improvements in railways.

Dated August 12, 1853.

1889. Thomas Allan, of Adelphi-terrace, Westminster, civil engineer. Improvements in electric conductors, and in the means of insulating electric conductors.

Dated August 15, 1853.

1097. Joseph Leon Talabot, of Chaussée d'Antin, Paris, iron-master, and John Davie Morries Stirling, of the Larches, near Birmingham, Warwick, Esq. Improvements in the manufacture of cast steel.

Dated August 25, 1853.

1978. John Shaw, of Manchester, Lancaster, landscape gardener, and Joseph Steinthal, of the same place, clerk. An improved manufacture of artificial manure.

Dated September 1, 1853.

2026. John Macintosh, of Pall-mall, naval engineer. Improvements in breakwaters.

2027. Robert Oxland, of Plymouth. Improvements in the manufacture of manure.

Dated September 2, 1853.

2028. John Hinks and George Wells, of Birmingham, Warwick, manufacturers and copartners, and Frederick Dowler, of Birmingham aforesaid, machinist. New or improved machinery to be used in the manufacture of metallic pens and penholders.

2029. John Tayler, of Manchester, Lancaster, engineer, James Griffiths, of Wolverhampton, Stafford, engineer, and Thomas Lees, of Stockport, Chester, machinist. Certain improvements in steam boilers, and in apparatus applicable thereto, and to be used therewith.

2030. Barthélemy Auric, of Grenelle, France. The new application of sulphate of lime to the fabrication of the mosaics and incrustations, and for any new processes of coloration of certain varieties of this substance.

2031. James Pigott Pritchett, the younger, of York, architect. Improvements in window-sashes and shutters.

2032. Augustino Carosio, of Genoa, now of Connaught-square, Middlesex, doctor of medicine. Improvements in obtaining power by the aid of an electric current, for motive and telegraphic purposes.

2033. John Sibley and Thomas Sibley, of Ashton-under-Lyne, Lancaster, machine-makers. Improvements in machinery or apparatus for cutting discs or circles out of plates or sheets of metal or other substances.

2034. William Ashton, of Manchester, Lancaster, machinist, and William Brotherton Harvey, of Salford, braid-manufacturer. Certain improvements in machinery or apparatus for manufacturing braid.

Dated September 3, 1853.

2035. John Thomas Jewiss and Daniel Jewiss, of Horsleydown, smiths. An improvement in furnaces.

2036. Ebenezer Dobell, of Hastings, Sussex, watch-maker. Improvements in clocks or time-keepers, and parts connnected therewith.

2037. Thomas Walker, of Birmingham, Warwick, engineer. Improvements in rotary engines to be worked by steam or other fluid.

2038. Albert Nagles, of Ghent, Belgium, chemist. Certain improvements in machinery or apparatus for washing, bleaching, dunging, and dyeing woven fabrics.

2039. Gage Stickney, of Hanover-street, Pimlico, Middlesex, mechanical engineer. An improved construction of blower. A communication.

2040. Gage Stickney, of Hanover-street, Pimlico, Middlesex, mechanical engineer. Improved machinery for forging metals. A communication.

Dated September 5, 1853.

2041. John Doyle, of Cambridge-street, Paddington, Middlesex. The waterproofing of boots and shoes.

2043. John Smalley, of Bishopgate, Wigan, Lancaster, accountant, and Washington Smirk, of Ince, in the county aforesaid, smith. An improvement in railway-carriage axles.

2044. John Henry Johnson, of Lincoln's-inn-fields, Middlesex. Improvements in the manufacture of stays or corsets. A communication from Adolphe Georges Geresme, of Paris, France, manufacturer.

2045. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery in weaving terry fabrics. A communication.

2046. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improvements in breech-loading guns. A communication.

Dated September 6, 1853.

2047. Thomas Bollmann Upfill, of Birmingham, Warwick, manufacturer, and William Brown, foreman to the said Thomas Bollmann Upfill. An improvement or improvements applicable to metallic bedsteads, couches, chairs, and such other articles as are or may be used for sitting, lying, and reclining upon.

2048. Lemuel Wellman Wright, of Charlford, Gloucester. Improvements in reaping and gathering-machines.

2049. André Calles, of Southwark-square, Surrey, mechanician. Improvements in manufacturing typographic characters.

2050. John Kerfoot, of Lower Darwen, Lancaster. Improvements in machinery for spinning cotton or other fibrous substances.

2051. Henry Wilkinson, of the firm of Messrs. Wilkinson, brass-foundry, Tottenham-mews. Improvements in the construction of air-furnaces, parts of which improvements are applicable to other furnaces.

2052. James Davis, of the Low Furness Iron-works, near Ulverstone, Lancaster, iron-master, and Robert Ramsay, of the same place, engineer and fitter. An improved engine to be worked by steam, air, or water.

2053. Thomas Pope and Edward Bufton, both of Birmingham, Warwick. Improvements in buttons, and which improved buttons they propose to designate by the name of "Buffalo Buttons."

Dated September 7, 1853.

2055. Isaac Smith, of Birmingham, Warwick, machinist, and Alfred Sommerville, of Birmingham aforesaid, merchant. Improvements in metallic pens and penholders.

2056. Joseph Alsop, of Huddersfield, baker, and Edward Fairburn, of Kirklers Mills, Mirfield, York. Improvements in baking bread.

2057. John Gaskin Fletcher, of Accrington, Lancaster, warehouseman, and William Peel, of the same place, weaver. Improvements in looms for weaving.

2058. David Law, of Glasgow, Lanark, North Britain, and John Inglis, of the same place, iron-

founders. Improvements in moulding or shaping metals.

2059. William Joseph Smith, of Stretford, Lancaster, salesman. Certain improvements in buttons or other such fastenings, and in applying or affixing them to wearing apparel.

2060. Weston Grimshaw, of Morsley, Antrim, Ireland, and Ellis Rowland, of the same place. Improvements in the manufacture of bricks.

2061. George Edward Ashton, "of the county of Middlesex," gentleman. Converting certain refuse materials into yarn, for the manufacture of woven and other fabrics.

2062. Benjamin Hustwayte, of Hockley-street, Homerton, Middlesex, bricklayer, and Richard John Paul Gibson, of Upper Brunswick-street, Hackney, builder. An improved composition or compositions applicable to the manufacture of bricks, tiles, and other moulded articles.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," September 20th, 1853.*)

987. Edward O'Connell. Improvements in the mode or method of feeding infants and invalids, and in apparatus connected therewith.

1025. John Filmore Kingston. Improvements in galvanic or voltaic batteries.

1079. Thomas Chambers and John Chambers. Certain improvements in kitchen sinks.

1123. Mariano Riera. Certain improvements in fire-arms.

1134. Edward Blackett Beaumont. Certain improvements in the mode of constructing dwelling-houses or other buildings, and in peculiar-shaped bricks and tiles to be used for the purpose.

1191. George Coppock. Certain improvements in looms for weaving.

1220. Charles Cowper. Improvements in machinery for combing and preparing wool and other fibrous substances. A communication.

1237. Samuel Wright. Making a gas, steam, air, or liquid safety tap.

1300. William Weatherley and William Jordan. Improvements in the stuffing-boxes of piston-rods.

1314. George Harriott. Improvements in agricultural implements employed in crushing and rolling land, and in frames for the same.

1325. Joseph Brown. The improvement of elastic spring beds, mattresses, cushions, and all kinds of spring stuffing for upholstery work generally, making them lighter and more portable.

1420. Samuel Frankham. An improved construction of coupling joint applicable to pipes, vessels of capacity, and other like uses.

1444. George Burstall. Improvements in the bleaching of oils and fats, and in machinery and apparatus connected therewith.

1519. Juste Giret. Certain improvements in artificial and malleable stones, and in the apparatus to be used for such purposes.

1623. John Knox Stuart. Improvements in hats and other coverings for the head.

1710. Samuel Perkes. Improvements in the construction of portable metallic folding bedsteads, chair-bedsteads, chairs, sofas, couches, settees, and such like articles for the use of emigrants and others, and part of which improvements are applicable to ordinary bedsteads, sofas, couches, chairs, and such like articles in general.

1742. Joseph Bennett Howell and William Jamieson. An improvement or improvements in the manufacture of saws.

1761. John Giblett. Improvements in the manufacture of woollen cloth and other fabrics.

1829. William Smith and Thomas Phillips. An improved boiler.

1875. Thomas Frederick Newell. Improvements in machinery for numbering the pages of books and documents. A communication.

1907. Joseph Leon Talabot and John Davie Morries Stirling. Improvements in the manufacture of cast steel.

1909. George Edward Dering. Improvements in electric telegraphs.

1929. Robert Clough. Improvements in the construction of ships and other vessels.

1932. Alexis Pigé. Improvements in locks and their keys. A communication.

1946. Jean Baptiste Polaillon and François Maillard. Improvements in the manufacture of starch.

1952. John Steven. An improved axle-box for railway carriages and wagons.

1974. Edward Heard. A certain mixture or composition of chemical agents for rendering sea-water fit for washing, and for softening hard water for similar purposes.

1991. John Davie Morries Stirling. Improvements in the manufacture of rails and parts of railways, and tyres of railway wheels.

1998. John Foss. Improvements in printing apparatus.

2001. Edward Patrick Gribben. Improvements in window-frames and sashes.

2007. Charles Goodyear. Improvements in combining India-rubber with other matters for writing, marking, and drawing. Partly a communication.

2008. Charles Goodyear. Improvements in rules, graduated scales, and measuring instruments.

2009. Charles Goodyear. Improvements in the manufacture and ornamenting or coating of articles when compounds containing India-rubber are used.

2011. James Picciotto. Improvements in burning and reburning animal charcoal. A communication.

2025. Richard Archibald Brooman. An improvement in paddle-wheels. A communication.

2027. Robert Oxland. Improvements in the manufacture of manure.

2037. Thomas Walker. Improvements in rotary engines to be worked by steam or other fluid.

2039. Gage Stickney. An improved construction of blower. A communication.

2040. Gage Stickney. Improved machinery for forging metals. A communication.

2046. William Edward Newton. Improvements in breech-loading guns. A communication.

2060. Weston Grimshaw and Ellis Rowland. Improvements in the manufacture of bricks.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed September 17, 1853.

1853:

673. Charles Harratt.

687. James Fraser.

Sealed September 21, 1853.

699. Thomas Bouch.

708. Bernard Boyle.
709. Hesketh Hughes and William Thomas Denham.
717. Henry Webster and Edward Dawson Stones.
726. Robert Hazard.
731. George Robb.
733. George Oakes Asbury.
773. George Hanson and David Chadwick.
882. Eliza Cunnington.
904. Joseph Adamson.
928. Henry Wilks.
1023. William Reid.
1389. Anthony Bernhard Baron Von Rathen.
1520. John Leach.
1535. Joseph Rock, junior.
1554. William Fairclough.
1649. Henry Brougham Hopwood.
1687. Henry Bessemer.
1689. Henry Bessemer.
1691. Henry Bessemer.
1719. John Dent Goodman.
1763. Alfred William Warder.
1764. Francis Arding.
1776. James Mackay.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
Sept. 22	3512	Thomas Cowburn	Bolton-le-moors	Oscillating safety-valve.

WEEKLY LIST OF PROVISIONAL REGISTRATIONS.

Aug. 1	525	John Bentham	Chorley, Lancashire	Segment spring light.
8	526	Duncan Sinclair and John Masson	Oxford-street Chapel-place	Rudder and steering apparatus.
11	527	S. G. Pape	Camden-town	Drawers.
,,	528	,,	,,	Trousers.
Sept. 15	529	William Collinmore	Brighton	Crotchet-cotton reel-holder.
16	530	Alfred Sommerville	Birmingham	Regulating-pen and holder.
17	531	S. G. Pape	Camden-town	Under vest.
,,	532	Robert Aitchison	Holloway	Winding-machine.
20	533	Thomas Brindley	Finsbury	Spring Bible and Prayer-case.

NOTICE TO CORRESPONDENTS.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

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MAUDSLAY'S PATENT FEATHERING SCREW PROPELLER.

Fig. 6.

Fig. 4.

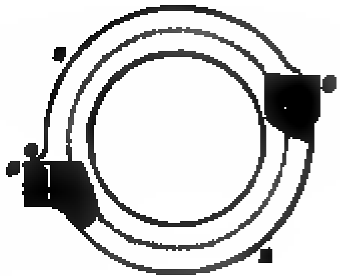

Fig. 5.

Fig. 2.

MAUDSLAY'S PATENT FEATHERING SCREW PROPELLER.

(Patent dated March 15, 1853.)

The feathering propeller, of which we are now about to lay a description before our readers, is an improved form of that previously patented by Mr. Maudslay in March 1848, and successfully applied in the *Bosphorus* and other steam-vessels recently built. The arrangement by which it is now proposed to feather the blades is, like its predecessor, characterized by a due regard to the requirements of practical working,—a fact which cannot fail to recommend it strongly to the favourable notice of shipowners, and ensure its rapid and general adoption. It may be worked from the deck of the vessel either when the propeller is at rest or in motion; it also affords the means of holding the blades at any angle that may be desired; and further, being combined with a lifting frame, may, together with the propeller, be raised on to the deck of the vessel when required. The advantage of feathering the blades while the propeller is revolving is, that by regulating the speed of the engines, the screw may be made to advance through the water at the same speed as that of the vessel, and the friction on the axles caused by the resistance offered to the blades when dragging through the water is obviated.

Fig. 1 of the accompanying engravings is a side elevation, partly in section, of part of a ship or vessel fitted with a screw propeller having the improved feathering arrangement adapted thereto. Fig. 2 is a plan view partly in section. Fig. 3 a cross section of fig. 1, but showing the screw-blades in elevation; and figs. 4 and 5, views of some of the parts detached. The screw is shown as being fitted in its framing so as to admit of its being disengaged from the driving-shaft and hoisted on deck through a well in the manner now generally adopted in screw-propelled vessels. A is the propeller-shaft; B, the boss in which the screw-blades, C C, are fitted. The blades are capable of turning on their axes when acted on as hereinafter explained; and are retained in position in the boss by means of the keys, D D, which pass through the boss and the spindles of the blades, as shown in the detached sectional view, fig. 5. The extremities of the spindles of the blades have levers, E E, fitted on to them, the ends of which are connected by pin-joints to the extremities of the links, F F, which again are jointed at their other ends to lugs, G G, cast on opposite sides of the outer flange of the grooved sliding-collar, H, which is free to be moved endwise on the elongated portion of the propeller boss, B. I is a fork or clutch attached to the outer extremity of the rack, J, which slides in the groove, K. The fork, I, rides in the groove of the sliding-collar, H, and gives motion to that collar, and consequently to the screw-blades, C C, when the rack, J, is caused to move in either direction by means of the pinion, L, which is driven by the worm, M, mounted on the spindle, N. This spindle has its bearings in the frame which carries the propeller, and is made square at its upper end to receive a socket on the lower end of another spindle, which is prolonged upwards to the deck and furnished at its upper end with a capstan-head, having holes to receive a handle, by means of which the entire feathering arrangement is worked. It will be readily seen that when this tiller-handle is moved, the sliding-collar, H, will, through its connections therewith, be drawn or pushed along that portion of the propeller-boss marked A^1, and the blades, C C, thereby brought to the feathered or sailing position, and *vice versâ*.

HOLLOW RAILWAY-AXLES.

We gave in our last Number a description of Mr. McConnell's new method of manufacturing hollow railway-axles, which formed the first part of a paper read by him before the Institution of Mechanical Engineers. The concluding part of this paper contains the results of some important experiments conducted by Mr. Marshall, Secretary of the Institution, for the purpose of ascertaining the comparative strength of the hollow and ordinary solid axles; we now, therefore, publish this portion of it, together with the discussion which ensued after it had been read:

The first series of these experiments was tried with a view to ascertain the comparative strength of the hollow and solid axles to resist a transverse strain:

Each axle was supported on massive cast-iron blocks, fixed at a distance of 4 feet 11 inches apart, to represent the support given by the rails to the axle. A cast-iron block, weighing 18cwt., was then let fall on the centre of the axle from a height of 12

feet, and the extent of bending was measured. The axle was then turned half round, and another similar blow given on the opposite side, bending it in the opposite direction; and this proceeding was repeated until the axle was broken.

The general results of these experiments are as follows:

An *Old Solid Axle*, 3¾ inch diameter in centre, and 4¼ inch at ends, which had been at work three years, was bent 8¾ inches by the 1st blow; it was nearly straightened by the 2nd blow in the opposite direction, then bent 10 inches by the 3rd blow, and with the 6th blow it was broken in the centre square across.

A *New Solid Axle*, of the same dimensions, was bent 9¾ inches by the 1st blow, then nearly straightened by the 2nd blow, and bent 9½ inches by the 3rd blow, and by the 4th blow 2¼ inches, and by the 5th blow it was broken ¾ inch from the centre. The appearance of the fracture was crystalline over three-fourths of the section, the remaining part tough fibre.

A *New Hollow Axle*, 4¾ inch diameter throughout, was bent 5 inches by the 1st blow, then nearly straightened by the 2nd blow, and bent again 5 inches by the 3rd blow. The 9th blow bent it 4¾ inches, and the 10th blow 1¾ inches. Up to the 15th blow it was bent alternately, the bends varying from 2 to 3¼ inches. There was no appearance of failure or cracking, but a slight rising of the surface at the 15th blow. The blows were continued to the 27th, the bends varying from 2 to 3¾ inches; and at this blow a fracture took place across the middle of the axle 1½ inches long. The 28th blow bent it ⅝ inch, and closed the fracture on the opposite side made by the preceding blow. By the 29th blow it was fractured two-thirds through, and bent 9¾ inches, the appearance of the fracture being very fibrous.

A second series of experiments was subsequently made, to ascertain the comparative strength of the journals of the hollow and solid axles to resist breaking.

Each axle was supported on an anvil, with the inner shoulder of the journal projecting 1½ inches beyond the edge of the anvil, to represent the support of the axle in the nave of the wheel; 100 blows with 24lbs. sledge hammers were then struck upon the upper side of the outer end of the journal, the men being changed after striking each twelve or thirteen blows alternately. The amount of bending of the journal was then measured, and the axle turned half over, and another 100 blows similarly given on the opposite side of the journal; the same proceeding being then further repeated.

The general results of these experiments are as follows:

An *Old Solid Axle*, with 3 by 5 inch journals, that had been at work three years, had one journal broken off with 205 blows, and the other with 53 blows: both fractures were square across the journal at the shoulder.

A *New Solid Axle*, with 3 by 6 inch journals, had the journal broken off with 570 blows, the fracture being irregular in form, and fibrous.

A *New Hollow Axle*, with 3 by 5 inch journals, had 400 blows on the journal, which bent down the end ⅝ inch, and produced a longitudinal split on the under side, 3¾ inches long, but no transverse fracture.

A *New Hollow Axle*, with the same size journals, received 800 blows on the end of the journal, which bent it down ½ inch, and split the journal longitudinally on both sides, but caused only a slight transverse crack near the shoulder, ¾ in. long.

The experiments on transverse strength, by a heavy weight falling on the centre of the axle, and giving the blow on opposite sides alternately, show that the hollow axle is nearly double the strength in that respect of the corresponding solid axle, the amount of bending being only 5 inches instead of of 9¾ inches, and the number of blows required to break the hollow axle being 29, whilst the solid axle broke at the 5th blow, shows the hollow axle to be greatly stronger in resistance to fracture.

The hollow axle became ⅛ inch oval in the centre after receiving the 7th blow, and it was only ⅛ inch oval after receiving the 28th blow just before fracture; being bulged outwards $\frac{1}{16}$ inch at each side, and $\frac{1}{16}$ inch inwards at top and bottom from the original circular section.

The experiments on strength of journals show that instead of the journals breaking off square and short at the shoulder, as in the solid axles, the hollow axle journals stand a considerably greater number of blows, and then only split up longitudinally, instead of breaking off transversely, being a very important advantage in point of safety in working.

Mr. McConnell exhibited a number of specimens of the axles tried in the experiments, and specimens of the hollow axles cut in two longitudinally, showing the thickness of metal to be quite uniform throughout the axle and journals. He also showed and explained an instrument used for measuring accurately the thickness of the metal at the shoulder of each journal, and in the journal after the axle was turned; it consisted of a double sliding gauge, one sliding part being inserted into the open end of the

axle, and shaped to fit closely to the inside of the shoulder, and the other sliding part fitting the outside of the journal and axle; the whole gauge was held steady on the body of the axle by the arm and clip. When the gauge was adjusted by a compound sliding motion so as to fit the axle inside and out, the exact position of the outer sliding portion was marked by bringing a screw stop in contact with it, and it was then withdrawn sufficiently to allow the gauge to be disengaged from the axle by drawing the inner slide out of the axle; the outer slide was then brought back to its former position by sliding it home to the screw stop, and the space thus left between the edges of the inner and outer slides gave a correct outline of the thickness of the metal, which was traced at once on paper. Each axle was examined in this manner and registered before it was sent out to work, so as to provide against any axle being turned out in an imperfect state from the journal being accidentally cut into the metal too much at the shoulder.

The Chairman (Mr. Samuel H. Blackwell) remarked, that in the fracture of the hollow axle all the iron appeared fibrous, but the fracture of the solid axles was mostly crystalline.

Mr. McConnell said he had found the same differences in all he had tried: the iron of the hollow axle was as fibrous throughout as the best bar iron.

Mr. W. Mathews inquired what was the saving in weight of the hollow axles, and whether they had yet been applied extensively?

Mr. McConnell replied, the reduction in weight was about 2-5ths theoretically to obtain the same strength, but it had been taken at ⅓rd of the solid axles, to be on the Midland, and Great Northern Railways, safe side. The hollow axles were being extensively applied on the North-Western, and more than 500 had already been made; some had been at work for nine months with entire satisfaction.

Mr. W. Mathews asked what was the relative cost of the hollow axles, and whether any difference was found in the crystallising of the iron from the effects of working?

Mr. McConnell said that no observations could be made on that point yet, and it would be difficult to arrive at any conclusion upon it, except from actual long work.

Mr. Norris observed that in the fractures of the new solid axles there was considerable variation, some parts being fibrous and other parts crystalline. He said he had tried many old axles that had been twenty years at work on the Liverpool and Manchester Railway, and none of them appeared crystalline on breaking off the journals, though several new ones were found to break crystalline; the new ones were about ¼ inch larger diameter in the journals. He doubted any crystallising effect being produced by working on the railways: he thought it depended more on the original manufacture.

Mr. Slate remarked, that iron would be crystallised if over-heated in the furnace, and the hollow axles might be injured in this way without proper care.

The Chairman said the most fibrous bar could be made crystalline in one part by overheating it.

Mr. Clift suggested, that less heat might be required to weld the hollow axle than the solid one, on account of the reduced substance of the iron, which would be less injurious to it.

Mr. McConnell observed, that in the case of the sling chains for holding up in forging large bars, and other similar instances, the continued concussion was found to have the effect of making the iron break in a certain time quite crystalline, though it had been quite fibrous originally; this was known to take place so regularly, that the time of breaking was reckoned upon, and they sometimes lasted only a few months. In the hollow axle there was a different condition of the iron from the solid axle, as in the latter the iron in the centre was not so solid as the outside, because the pressure was only applied on the outside, and the larger the bar the more this was perceived; but in the process of manufacture of the new hollow axle, in consequence of the internal pressure combined with the external, and the small thickness of the metal, the whole axle was made as solid as the outside of an ordinary axle. It had, in fact, two skins, one outside and one inside.

Mr. Slate remarked, that the skin of iron was generally looked upon as stronger than the rest, but he doubted whether the skin was really of much importance to the strength, as it could only be thin film of scale or oxide. He should like to see the experiment tried of a hollow axle bored out and turned so as to remove the skin, and expected it would be found to make little difference.

Mr. McConnell said the skin was important in cast iron, and the strength was considerably diminished if the skin was removed; he thought something of the same kind applied to wrought iron.

Mr. May hoped the experiment suggested would be tried; he thought the ordinary idea of the skin was a delusion, both in cast and wrought iron, and he believed there would even be found more strength per

square inch in the area left if the skin were planed or turned off.

Mr. Duclos observed, that in cast iron the skin would be different in composition, assimilating to steel, and harder than the rest of the metal, if not stronger, according as it was more less chilled, but in wrought iron the skin was mainly oxide of iron, and was really weaker than the pure iron.

Mr. Slate thought a cast-iron bar planed down ⅛th inch on each side would prove quite as strong per square inch as before.

Mr. James Nasmyth said he had tried a careful experiment on that very point; he cast some bars 2¼ inches square, and planed some of them down on each side to 2 inches square, and he found that these were 10 per cent. weaker for the proportionate transverse breaking strength. These bars were green sand castings, and consequently partially chilled; loam castings would not probably show the same effect; he considered the effect of chilling was to increase the strength.

Mr. Slate said he had made a somewhat similar trial, though not so careful an experiment, and he did not perceive any difference in the strength of the skin.

Mr. May observed, that ⅛th inch on every side might be too much to remove for ascertaining the relative strength of the skin alone, as the interior of a large bar was not so strong. It had been ascertained by the experiments of the Government Commissioners, that a cast-iron bar, 3 inches square, was only ⅔rds the proportionate strength of a bar 1 inch square, as the centre of the bar becomes less solid in cooling; consequently, a bar 1 inch square, cut out of the centre of a 3-inch bar, would be considerably weaker than a bar cast 1 inch square, and not from the circumstance of the skin being removed, but from the iron being less solid; if only about $\frac{1}{16}$ inch were planed off a bar, it would remove the skin, but he thought the strength would be found not to be injured.

Mr. J. Nasmyth considered the skin effect extended more than ⅛th inch deep, at least the chilling was perceptible so far.

Mr. G. England remarked, that if the less dense part of a solid axle at the centre were taken out by boring, the axle would not be proportionately diminished in strength; and this was in effect done in the hollow axle, with the additional advantage of the internal pressure, making the iron as sound throughout as in a thin bar, and considerably sounder and stronger than it would be in a large bar or shaft.

The Chairman said it was certainly much easier to make a bar 1 inch thick, of good quality and fibrous throughout, than one 3 or 3½ inches thick; and in effect the hollow axle was a bar less than an inch thick throughout, in place of the ordinary solid axle, 3½ or 4 inches thick.

Mr. McConnell thought it had to be defined what was meant by the term skin; in forging any bar it became denser gradually at the surface, and consequently stronger, the effect penetrating to a greater or less depth, according to the circumstances, and it was that he referred to, not a mere film on the surface.

Mr. Slate remarked, that in reference to the crystallisation produced in iron by concussion, he thought the effect did not take place unless the strain was beyond the elastic limit more than five or six tons per inch, so as to cause a permanent change in the arrangement of the particles of the iron. He had tried an experiment in connection with Mr. Wild, in which a weight was suspended by a bar an inch square, and was lifted up and down eighty times per minute by an eccentric worked by a steam-engine constantly, night and day. This was continued for a length of time that was supposed equivalent to the effect of twenty-five years' work, but no change or crystallisation in the iron was perceived.

Mr. McConnell observed, that whatever was the nature of the strain, and the change produced by concussion, the effect of the continued blows and concussion to which a railway axle was subjected must be greatly diminished when the axle had a large hollow through the centre, instead of being entirely solid, as the effect of a blow on one side would be mostly lost in the vacant space of the centre, instead of being all communicated through the mass of the axle. He showed specimens of a hollow and a solid axle, which had been run hot for two hours, without oil in a lathe, at a speed corresponding to about 20 miles an hour travelling: the solid journal broke off with 179 blows quite short and crystalline, but the hollow journal would not break transversely, and split longitudinally in several places with 400 blows, and did not appear injured.

Mr. Adams said he thought the conical journals were preferable to the ordinary cylindrical ones, and they were particularly adapted to the manufacture of the hollow axles, by avoiding the sudden shoulder. He had found the conical journals less liable to heat than the others when well fitted. In the cylindrical journals, as square shoulders were found preferable in practice to shoulders much rounded, it was important to maintain a uniform strength of metal at the shoulder.

The Chairman observed, that the subject of railway axles was of great importance for safety and economical working, and the

new hollow axle appeared to be a valuable and successful improvement.

NORRIS'S RAILWAY JOINT-CHAIR.

The following paper on Mr. Norris's new joint-chair was read at the last meeting of the Institution of Mechanical Engineers at Birmingham:

In bringing before the Institution a plan for a new kind of joint-chair for railways, it will be unnecessary to expatiate on the advantages of a *firm joint*, as regards economy of maintenance of the road and rolling stock, and safety.

The object of this Paper is to describe a method which has been in use on a crowded part of the London and North-Western Railway for above eighteen months, during which time it has stood well, and is now being extensively used on the same line

The plan is to cast a chair or coupling on the rails at the joints as they lie in the line, by means of chills and a portable cupola. The hot metal flowing freely into the chill is allowed to come in close contact with the rails, and in cooling contracts so as to grip the ends of the rails firmly together. The great object to be attained is the converting of the rail into a continuous girder, which shall not deflect at the joint more than at any other part; every successive year's experience having forced the attention of engineers and others to this point, to attain which many plans have been tried with more or less success.

Whatever mode of joint is adopted, or whatever method of joining the ends of rails, it is necessary that a certain allowance should be made for the longitudinal motion caused by the expansion and contraction of the rail. This object is attained, wherever necessary, by putting the chills, previously heated, on the ends of the rails for a short time, until they become hot, when they are taken off and a thin wash of loam and blacking is laid upon the rail-end, which instantly dries on, and when the melted iron is poured against it, absolute contact with the rail is prevented. Although provision is thus made for the expansive and contractile force of the rail, the cavity in the chair being parallel to the rail, clips it sufficiently tight to prevent any vertical or lateral motion of the rails; the amount of surface of contact between the rail and chair is about 100 square inches, being 50 square inches to each rail-end.

This great surface prevents any perceptible wear taking place on the rail-ends from the longitudinal motion of expansion; and as no motion can take place vertically or laterally, no shock can take place by the action of the wheels, so that the joint will remain good for years, which has been confirmed by practice, so far as it has gone.

The operation of casting is very simple, and is performed without hindering the passing of trains during the execution of the work.

The apparatus consists of chills and a portable cupola, and the process is as follows, when operating on a line already laid: — Each joint-sleeper or block is first lowered by the platelayers about three inches, so as to give room for the application of the chills, or is removed altogether for the time, and the old chair being taken off the joint, the chills are applied, consisting of a bed-plate with two lips, one on each side, holding down the side-chills, which slide in the grooves; these are put to the rail and held together by screw-clips, forming a mould for casting the chair. This operation is quickly performed, and the chill is then packed under temporarily with loose metal plates; the moment this is done a train may pass over it without hindrance.

Two steel pins are then put in their places in the chills, so as to form the cores for the holes of the holding-down spikes. The chill-mould being thus fastened in its place, is ready for the melted metal, which is run into it at the lip, until it is level with the top of the sides, where a large open space is left for the escape of air, which prevents all possibility of blowing.

The chills are made to fit the rails by projections at each end, which grip the rail firmly, and a little loam is applied on the outside, to prevent the hot metal making its way out of the chill-mould.

After a lapse of about five minutes the mould is taken off, which is done in an instant, leaving the chair perfect, and closely embracing the contiguous ends of the rail. The form of this chair is such as to make it a strong and rigid clip, closely fitting the two ends of the rail along its whole length. Chairs may by this method be cast of any form. When the chair is cold enough, the sleeper or block is replaced, and the chair spiked to it.

The operation is the same in relaying new roads, only that the expense of lowering or removing the block or sleeper is saved.

The metal used up to the present time has consisted of old chairs, mixed with a little new iron. This is melted in a portable cupola, formed of a cylinder of sheet-iron 1-16th of an inch thick, 2 feet 3 inches in diameter, and 4 feet 6 inches high, lined with fire-bricks and clay in the usual manner, 4 inches thick.

The cupola weighs about 6 cwt.; and is

easily lifted by the workmen on to a plate-layer's lorry, and taken to the place required, when it is lifted off and placed on a few sleepers laid on the slope of a cutting or embankment. When once so placed it will serve for half a mile of road without moving again, as the metal is so hot as to enable its being taken, in a moulder's ladle, on a lorry to the chills at a quarter of a mile on each side the cupola.

The cupola has a belt or air-chamber, into which passes the air from the fan, and it has four tuyeres of two inches' orifice to admit the air to the fire. The fan consists of a chamber 1 foot 10 inches inside diameter and 9 inches wide, and weighs about 3 cwt.; it is detached from the cupola by drawing out the nozzle from the entrance to the air-belt, and can then be lifted separately into its place. The fan is either turned by hand-winches, or, when the operations are extensive, by a small steam-engine, weighing about 10 cwt., and can be lifted by eight men, and placed on and off a lorry, and on to the slope, in the same manner as the cupola.

The yield of metal from so small a cupola is very great: as much as 3½ tons has been run down in seven hours, by two men turning the handles of the fan, and nearly 4½ tons by the use of the engine in the same time.

A smaller cupola, weighing about 2 cwt., is used for repairs of the line.

A good fastening is made for middle chairs by taking out the wooden key from the common middle chair, and casting an iron one in its place. This is done by heaping dry sand round the chair, as it stands in its place, and then running metal into the cavity so formed, leaving a lip projecting over the chair. Only a few of these have yet been put down; but they have stood the test of two years' working over without failure, and are still tight. In casting, the hot metal running into the chair expands it, and its contracting upon the cast key in cooling makes it tight.

It may be remarked, that the new chair occupies exactly the same position on the sleepers, and has the same fixing as the common joint-chair; so that in case of damage to the line from accident or slips, it can be repaired quickly in the ordinary manner, by using the old chairs and wood keys until the small cupola can be brought to bear.

Mr. Norris exhibited specimens of the chairs and the cast-iron mould, complete; also a specimen of one of the new joint-chairs from the North Union Railway, which had been laid down for eighteen months in a line of great traffic, where 500,000 wheels had passed over it during the time; the two rail ends were cut off, and remained fixed fast in the chair, and the surface of the joint was level and smooth, although the rail ends had been much indented at the time the chair was cast on, from the rails having been recently turned.

The Chairman inquired what length of line had been tried with the new chairs, and how long they had been at work?

Mr. Norris replied, that five miles had been recently laid with these chairs near Rugby, and about a mile was previously laid near Crewe, and elsewhere, which had mostly been at work one and a half years.

Mr. Woodhouse said, the recent trial of the chairs near Rugby had been made under his superintendence, and he had found the result highly satisfactory. It had been intended to relay that portion of the line during the present summer; but the new joint-chairs had proved of such benefit, that they would probably give several years additional life to that road. He consequently recommended the adoption of the plan on a considerable length at other parts of the line, which was now in progress.

The Chairman asked what difference was felt in the trains running over the joints on the portion that had been altered at Rugby?

Mr. Woodhouse said, the joints could not be felt at all with the new chairs; there was no comparison of the ease in travelling over the old plan of joints.

The Chairman asked what was the usual time required for the process of casting the chairs?

Mr. Woodhouse replied, that the average of the work done at Rugby was about one chair cast every four minutes, including the whole process of preparation.

Mr. Slate remarked, it was certainly a very ingenious process of casting the chairs, and must make a thoroughly firm joint; he inquired what was the expense of casting?

Mr. Norris said that the labour of casting cost about 6d. per chair, and the cost was about 1s. per chair, including all expenses except the metal, which weighed about 50 lbs. The expense of casting was much diminished as the men got more experienced in managing it. At first they could only cast 40 chairs per day, but the rapidity of casting increased with practice to 80 per day; and now 120 per day were cast by common platelayers, who had never before had anything to do with melted iron.

Mr. Slate said he had seen the first of these chairs one and a half years since, and had then an unfavourable opinion of their standing in work, from the great contraction of the melted metal in cooling on the

rigid rail; but it appeared that the wrought-iron rail was expanded by the heat of the melted metal sufficiently to make the chair safe by its contraction again in cooling. He thought the new chair made a very perfect coupling of the rail ends, and was a great improvement on fishings and other plans, which he could only regard as makeshifts; and though they had a very good effect compared with the previous plan of having nothing to couple the rails together at the joints, they were still far removed from perfection. The new chair might be said to be quite perfect, if it could be made quite fast on the rail without allowing it to slide.

Mr. Norris observed, that only every third or fourth joint was made a slip-joint for expansion; he was aware what a great advantage it would be to have no slip-joints, and by no means maintained that to be impracticable; the expansion of the rails successively by the heat of casting the chairs on, would perhaps elongate them sufficiently to make provision for the expansion from the highest temperature they would be afterwards exposed to, and the tension would then resist the contraction from cold.

Mr. May remarked, that Mr. Brunel had now many miles' length of Barlow's rail on the South Wales Railway, all riveted fast together, without any provision for expansion, and no difficulty was experienced in consequence. There was some misconception on this point, respecting the action of expansion; it was limited in amount of force, and if opposed by a greater force, no amount of expansion or contraction could take place. Wrought-iron raised in temperature 15° was expanded $\frac{1}{10000}$th of its length, and exerted a force of 1 ton per square inch of section by the expansion; consequently, no expansion of the rails would take place if a resistance were opposed of 1 ton per square inch for each 15° rise of temperature. He thought it probable that Mr. Norris's plan ultimately would require to have no expansion-joints to perfect it, and in many cases he did not doubt the plan being an excellent one.

Mr. James Nasmyth said he had witnessed the whole process of casting the chairs, and fitting on the iron moulds, and considered it a very successful plan, and of the utmost value and importance to the durability of the line as well as to the safety of the public. The trains ran full speed over the red-hot chairs directly after they were cast. He thought the slight tortuosities of all roads, even in the straight parts, would be probably found sufficient to allow for the effect of expansion, without making any provision of slip-joints.

Mr. May suggested, that an experiment could readily be tried to ascertain the actual amount of expansion of the rails, by having a number of thin graduated wedges, to be dropped into the joints at the hottest part of the day and at night, to measure the amount of expansion over a considerable length of rail. It would probably be found to be very insignificant, as the ordinary chairs offer a considerable resistance to a longitudinal motion of the rail, by the hold of the keys on the rail, the chairs on the keys, and the ground on the sleepers; though of course the resistance in Barlow's rail was a different case, where the rail, chair, and sleeper were all one.

Mr. Woodhouse remarked, that in laying the rails the men place small wooden or iron packing pieces, 1-16th of an inch thick, between the rail ends at the joints, to make the ordinary allowance for expansion; and they always find that if these pieces are put in early in the day, they become so tight in the middle of the day that they cannot be got out, but are quite loose in the cool of the evening.

The Chairman observed, there was no doubt the expansive action of the heat would always produce its full effect, either by compressing the iron of the rails, or producing some motion or distortion in their position.

Mr. Norris said, that cases had occurred of the road becoming hog-backed, rising with the sleepers out of the ballast, from the want of sufficient allowance for expansion; also in curves, the rails and sleepers had been pushed bodily outwards in the ballast by the effect of expansion. The extreme change of length in this country, from 80° or 90° variations of temperature, amounted to a yard per mile, and this yard length must be disposed of somewhere in each mile, either by sliding or tension, or else by bending upwards or laterally, if there was not less resistance to compression of the iron.

Mr. C. Cowper remarked, that the extreme change of temperature of 90° would cause a total strain on the iron of 6 tons per square inch, at 1 ton for 15°, which amounted to the very severe total force of 40 or 50 tons on the whole sectional area of the rail of 7 or 8 square inches, to overcome any supposed resistance.

Mr. May thought the change of temperature in the rails would be considerably less than that of the air, because they were partly buried in the ground, and must therefore follow the temperature of the surface of the earth, which fluctuated much less than that of the air.

Mr. Duclos remarked, that the expansion or contraction of the rails would only take

place from the mean temperature to the maximum or minimum; and as the mean temperature of the air in this country was about 50°, and the maximum 90°, making a change in the air of 40°, the actual change in the rails from the mean temperature was probably less than 30°, causing a strain of not more than 2 tons per inch expansion or contraction.

The Chairman observed, it was an important subject for consideration, whether the allowance for expansion could be entirely dispensed with; and the new chair appeared an important step in that direction, and might lead to doing away with longitudinal bearings.

Mr. Norris said that his attention had been first directed to the subject of this chair about two years since, by the circumstance of a very extensive alteration having been in contemplation from the ordinary rail and cross sleepers to a bridge rail on longitudinal timbers, the alteration being proposed entirely on the ground of obtaining a superior coupling of the joints with the longitudinal bearing than the ordinary rail and chair. But he objected to the bridge rail and longitudinal timbers as more expensive; and the idea then occurred to him of running the melted metal into the chairs to fill them up solid, and make a rigid coupling of the joint; and this led him to casting the joint-chairs solid upon the rails in their places, as the complete way of carrying out the object.

INSIDE AND OUTSIDE CYLINDER LOCOMOTIVES.

We extract from the last published part of Mr. D. K. Clark's valuable Treatise on Railway Machinery, the following discussion of the principles involved in the construction of locomotive carriages:

Inside-cylinder Locomotives.—In the earliest locomotives, no regard was paid to the propriety of classifying and separating the duties of the different parts of the machine. The boiler was the real foundation upon which the engine was erected, and the axle-bearings fastened: the cylinders have been plunged into the boiler, or fixed severally upon the smoke-box, the barrel, and the fire-box, with intermediate axles hung upon the boiler, and in various attitudes according to the taste of the designer; the gearing was stuck on anywhere, and the shell of the boiler pierced with numerous bolt-holes; for what could be stronger than a hollow cylinder of plate-iron riveted into one compact barrel, and what more suitable for strength and rigidity to the mechanism fastened to it?

Cylindrical surfaces, though strong, were not found convenient for attachments; so a frame was provided to carry the engine, machinery, wheels, and the boiler itself. The boiler, though relieved considerably by the change, was still charged with the cylinders which were placed below, inside the smoke-box, and bolted to the front and tube-plates; though, immediately on the outside, the smoke-box was bound by brackets to the frame, and the strain between the cylinders and driving-axle thereby transmitted, without running through the body of the boiler.

But though some difficulties were thus removed, others supervened. The strain between the cylinders and the axle is no trifle, for it is, in fact, the pressure of the steam in the cylinder; the pressure acts on the ends of the cylinders alternately, and also on the pistons, from which the strain is transmitted by the connecting-rods to the axle. Thus the cylinders and the axle are alternately strained together and strained asunder. To meet this alternate straining, the outside frame was interposed, uniting the cylinders to the axle, through the medium of the smoke-box brackets. The frame thus acted as a strut to prevent compression, and as a tie to prevent elongation; but imperfectly, *because the connection was not direct*; it was made laterally through the smoke-box stays, and these stays could not be kept in good order; they worked loose, and set the whole framing a twisting. It is true, inside frames were applied, uniting the smoke-box to the fire-box, and embracing the axle with the object of meeting the horizontal strain upon it; but these were little better than figments, their capacity was limited, their bearings on the axle narrow, and, though well intended, they readily wore clear of the axle, and left the outside frame to do the greater part of the duty. Bury,—and when we say Bury, we generally mean James Kennedy, his accomplished and responsible partner,—knowing the essential weakness of the outside frame for the required purpose, dismissed it entirely, and gave his engines a pair of broad and responsible bearings upon the axles inside the wheels alone, carrying out the frame inside the wheels, and close outside the smoke-box and fire-box. But, while he acted thus far on sound principles, and while his frame actually grazed the cylinders, he did not in his first engines seize the opportunity of binding the cylinders at once to the frame: he, like others, bolted the cylinders to the front and back plates of the smoke-box, and, removing the smoke-box stays, led the strain circuitously through

the boiler and the brackets by which it was bolted to the frame. The real distinction on the question of framing, then, is, that while others had their principal framing outside the wheels, Bury placed his principal and only frame inside, and by so much shortened and stiffened the lateral connections formed by the boiler-brackets between the cylinders and the driving-axle; meriting the opinion of M'Connell, in 1845, that his engine was "a good, strong, compact machine."

In later designs, Bury remedied the fault of his earliest plans, by placing under and fitting to the cylinders two strong transverse bars, passing through the sides of the smoke-box, and bolted to the frame and to wings cast upon the cylinders; this made a very firm and direct connection, relieving the boiler of all straining from the engine.

Sharp, retaining the outside frame as the foundation of his passenger-engine, for the sake of outside axle-bearings and better accommodation between the wheels, and aware of its weakness on the score of indirect connection, resolved to provide for this by uniting all the parts of the machine in one solid mass, which would stand or fall as a whole. He threw out wings from the front and back plates of the smoke-box, which rested on and were riveted to the frame, and inserted filling-up plates between and riveted to the smoke-box, frame, and wings, so as to forbid any play in that quarter; he bound the fire-box to the frame by similar wings, consisting of plates on edge of great strength, flanged and riveted, and by an extensive foot-plate and lower draw-plate riveted with lines of angle-iron to the frame and the back and sides of the fire-box. The boiler being thus wedged into the frame, and being further bound together by four inside stay-plates between the fire-box and smoke-box, it was reasonably expected that nothing could give way; and, in truth, it is to this almost invincible elaboration of framework, that Sharp's engines are known over the world as the most durable of outside-framed engines, as Bury's have been unquestionably the most durable of engines with inside frames.

The durable qualities of Sharp's and Bury's engines are, however, very differently derived. Sharp, by a due accumulation of iron and riveting, opposed the strength of iron successfully to the disorganizing action of high-pressure steam. Bury went directly to the point; he placed the frame where the frame should be, and conducted the steam-pressure to its destination through a single solid bar. Sharp certainly established a secure, though circuitous, communication with the driving-axle. Bury went straight at it, and caught the axle by the neck. On the principle of direct connection already laid down, we are bound to prefer Bury's general design, without committing ourselves to details.

Closely allied to the question of direct connection, is the question of inside and outside bearings on the driving-axle. The wheel, the crank-pin, and the axle-bearing or journal, on each side of the machine, should be in close juxtaposition; if it were possible, they should be at the same part of the axle. At each there is something to be done, and transmitted along the axle; and the closer they are, the more direct is the action of one on the other, and the less their lateral leverage, and the incidental straining to which the axle is subjected. Here, again, Bury had the advantage, for, by connecting the cylinder directly with the axle and inside the wheel, he planted his bearing immediately between the wheel and the crank, and thus compacted the straining within the smallest possible physical limits. This advantage Sharp, even with his rigid frame, could not reach, as his inside-bearings were mere auxiliaries to the outsides; and, in the due course of wear, his axle broke loose from the insides, and depended more and more upon the extreme bearings outside. In this way, the very rigidity of his frame told upon the durability of the axle, as there was no scope for a compromise: the outside frame *would not* work loose, and the axle must, therefore, yield more and more under the horizontal strain, before obtaining relief from the inside bearings, as the latter wore away, until its horizontal deflection would reach and surpass the limits of natural elasticity, and lead inevitably, though gradually, to a final rupture.

Of course, the propriety of having the responsible and only bearings of the driving axle inside, between and close to the wheels, on the grounds just stated, does not affect the position of the bearings of the merely carrying-axles, as these have nothing to do with the action of the engine. When the bearings are all between the wheels, they fall into a direct line on each side, and demand a simpler frame than when the carrying-axles have their bearings outside the wheels; as in this case, double-framing is necessary to embrace the inner and outer-bearings. For this reason, and also because the downward pressure of the load on inside bearings assists the wheels in resisting lateral concussions between their flanges and the rails, Bury has constantly employed inside-bearings exclusively for all the axles. To the latter argument we attach no importance, as experience has amply proved that well-formed carrying-axles with outside bearings are as durable as any; indeed we

should feel, on a first view of the case, rather in favour of outside-bearings, as the axle may safely be reduced beyond the wheel, and the journal made of much less diameter than if inside, which both increases the elasticity of the axle—increasing also its probable durability—and reduces the journal-friction, this friction being in proportion to diameter and independent of length. The greater simplicity of frame for inside-bearings is admitted; at the same time, the most important parts of the framing—the inside connections of the cylinders and driving-axle—are simplified by being relieved of the provision for other bearings, better accommodation is provided for the springs, and, as already insisted upon in a previous chapter, outside-bearings to the carrying-axles, increase the stability of the machine. To the argument for simplicity, then, little weight is attached, as the vital parts, those which receive and transmit the action of the steam, are unimpaired by the removal of the inside carrying-bearings — indeed, we think, rather improved.

Stimulated, doubtless, by the example of Bury's engines, and by their own experience, the makers of outside-framed engines felt the necessity of adding to the durability of their inside-bearings; and they made them longer, to be of equal area with the outsides, or such that the length multiplied by the diameter was the same in the two cases, and in hopes also that by equalizing the wearing surfaces of the axleboxes between their guides, the boxes on the two sides of the wheel would wear equally, and that the axle would thus work fairly and durably. The axleboxes, however, do *not* wear equally, as the elasticity of the axle is still at work, and as the inner-bearing is nearer the crankpin, the origin of the working-force, it receives the greater part of the strain, and wears more rapidly than the outer. Thus recurs the evil of a strained axle, with wide points of resistance, only more gradually consummating a fracture than in previous designs.

To bring about equal wear of the outer and inner axleboxes, their wearing-surfaces would probably require to be in the inverse ratio of their distances from the crankpin. Taking Sharp's later engine, with which Fairbairn's is nearly identical, the centres of the journals are $8\frac{1}{4}$ and $20\frac{1}{4}$ in. distant laterally from the centre of the crankpin, or at mean distances as 1 to $2\frac{1}{2}$ nearly: the wearing surface of the inner box should then be $2\frac{1}{2}$ times that of the outer, to wear equally. Were such a ratio to be observed, however, the outer box would necessarily be so reduced as to render it of little service for horizontal action; and it would be preferable either to dismiss it entirely, or to confine its operation to merely sustaining its load, the driving weight being divided equally between the inside and outside boxes. With this view, the outside guides should be retained, merely for steadiment, with sufficient clearance from the box to prevent horizontal action. In this way the architectural character of such as Sharp's and Fairbairn's engines would be preserved; and we should really regret to find these beautiful models of framing superseded.

As the inside members of double framing rose into importance, a more secure connection with the cylinders became obviously desirable. Bury had again set the example: he had carried out the inside frames to the buffer-beam, and had bound the cylinders to them independently of the smoke-box fixings; while, in the double frame, makers had been content to land the insides upon the back of the smoke-box, and to bolt them to it, thus interposing the tubeplates to which the insides and the cylinders were separately attached. This connection was indirect; the insides were, therefore, extended to the buffer-beam, and lateral flanges were added to the cylinders, by which a broad, secure, and direct connection was effected.

At the same time, as the result of modifications in the valve-gear, by which vertical valve-faces were introduced, placed between the cylinders and facing each other, the two valve-chests, previously separate, were thrown into one, and they formed, with the cylinders, two large castings, which were bolted together and to the inside frames. Thus was elaborated the system of inside-cylinder connections now generally practised, by which the inside frames and the cylinders became thoroughly bound together into one mass, and gained immensely in strength and power of resistance to shocks of every kind. Bury, dismissing the transverse bars which bound his cylinders, modified his engines in the same way.

But the frame, besides converting the steam-pressure into tractive force, by turning the driving-axle, also transmits the tractive force through the draw-gear. This should be done exclusively by the frame, and Bury and Sharp provide for it by suitable connections behind the boiler. In many earlier engines, and in some of the latest, the draw-gear is fixed directly to the back of the fire-box; thus the force comes on the boiler, which, of course, must receive it from the frame, in violation of the first principle of direct connection. Many makers terminate the inside frame in front of the fire-box, and fix it with brackets, to permit of the lateral extension of the fire-

box to the utmost width permissible between the wheels. This expedient is unnecessary, as fire-boxes of sufficient dimensions may be arranged without resorting to it. And really the gain in width is just about two inches,—a mere trifle, unworthy of the amount of preparation made for it.

In coupled-wheel engines, every consideration in favour of direct connection is of still greater importance, as the extra straining of coupled axles is to be met, due not only to the additional points of traction, but to the unequal action induced by tear and wear described in a previous chapter. The coupled axles ought to have their bearings all and exclusively inside, and in one continuous frame, as in Bury's and Sharp's engines; and any attempt to confer outside bearings on the coupled axles, as in Hawthorn's and Sturrock's, leads to the same evils, in an aggravated form, that characterize the single-wheel engine under the like arrangement. The attachment of the draw-plates to the boiler in coupled engines, as in Sturrock's, is also particularly inexpedient, as the outside frame receives and transmits almost the whole of the tractive action, which must, of course, have to pass into the boiler through the lateral brackets and the fixings of the inside frames. Hawthorn arranges better; he makes the best of his general design by fixing the draw-plates exclusively to the outside framing.

Outside-cylinder Locomotives.—The application of the principles just discussed, to the conditions of outside-cylinder framing, is pretty obvious. The general practice is to use inside frames with inside bearings on the driving-axle, and to bolt the cylinders to the same frames. The cylinders are necessarily external to these frames, and are entirely apart; the benefit of the strong union of inside cylinders together and to the frame being thus unavailable, the framing must be stiffened and bound together by other means. Some makers use merely a single inside plate on each side, with inside bearings to all the axles, as in Stephenson's; others, as Crampton and Allan, add a second plate outside the wheels, with outside bearings for the carrying axles. The double framing is preferable, as it gives outside bearings, which are more important for stability than with inside cylinders; it also strengthens the connection of the cylinders by giving them an additional hold, and it stiffens the whole frame generally. When all the wheels are coupled, an outside frame-plate is not expedient.

IMPROVED SOUNDING INSTRUMENT.

To the Editor of the Mechanics' Magazine.

Sir,—I observe, from what Dr. Scoresby has been saying, before the Association at Hull, that there seems to be some difficulty about obtaining a correct sounding in places where the currents are strong, and flow in different directions at the different points of depth, thus causing the line to assume different curves in its descent, so that when it comes to be measured after the weight has reached the bottom, and been hauled up again, the measurement gives no approximate idea of the real depth. Now it is plain that this measurement of the depth of water might be as well made by estimating its vertical pressure, as in measuring the height of mountains we measure the barometical pressure of the air, and so I would propose to do it by an instrument such as represented in the accompanying figure, and constructed as follows:

An accurately formed tube, *a*, of gun-

metal, or brass, or some metal not very easily corrodible by salt-water, has a glass tube, *b*, filtered on to it at the top by a screw-joint; and again on the top of the glass-tube is fitted a strong, hollow copper ball, *c*, by a similar screw-joint. The lower tube, *a*, has a well-turned piston, *d*, fitted to it, from which runs a rod which is only a trifle longer than the tube, *a*, and just enters the tube, *b*, when the piston is at its lowest point. A well-made spring is placed in the tube, *a*, above the piston, and the tube, *a*, being narrowed at the top, so as just to admit the free passage of the rod, and the rod having a little button at its top, the piston is kept at its lowest point by the spring; except when sufficient pressure is applied from below to compress the spring. The glass tube has a small ring fitted in it, so as to stick at any point to which it is pushed, and the button at the top of the rod serves to push the ring straight. The ring thus forms an index of the degree to which the spring has been compressed. The ball on the top serves as a mere reservoir of air to equalize the action of the apparatus as much as possible. The whole of this apparatus is enclosed in a wire cage, for the sake of protection from blows. To graduate this apparatus, I let it down in a known depth of water, say 10 fathoms, and having observed the point to which the ring in the glass tube is pushed, and having marked this point off, the ball is to be unscrewed, and with a small ramrod the ring is to be pushed down till it rests on top of the piston-rod. The ball being then replaced, the apparatus is sunk in 20 fathoms. After a similar manner it is sunk in 30, and then in 40 fathoms. This will test the accuracy of the apparatus; and the marks made on the glass tube, *b*, after each trial will give a scale from which the whole tube may be graduated even to thousands of fathoms, if the tube be long enough, or the spring strong enough. I have been induced to make this lengthy communication on account of the great use which may be made of such an apparatus, under many circumstances, where, for the reasons above stated, accurate soundings could not be obtained by the ordinary method.

I remain, Sir, &c.,

F. MAXWELL LYTE.

Florian, Torquay, Sept. 19, 1853.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

JOHN GILBY, of Beverley, York, Esq. *Improvements in fire-arms.* Patent dated March 12, 1853. (No. 620.)

Claims.—1. Securing the breech down, during the discharge, by a spring, or slide, or catch, or bolt, one or more of them.

2. A method of throwing the breech up into a firm and proper position for charging.

3. The application of a groove or grooved aperture or apertures in the breech-case, round or near the juncture or point of contact of the barrel and breech, with or without a tube or tubes, channel or channels, for the purpose of receiving or carrying off the gases or carbonaceous deposit which may escape between the breech and barrel during the discharge.

4. A method of priming by throwing the breech up, and then forcing the nipple into or against the priming, so that the nipple may carry off the priming when the breech is returned to its place in the line or direction of the barrel. Also, certain methods described of placing the priming in the proper position for the nipple to carry it off, and withdrawing the detent into the stock when the nipple has so carried it off.

5. The application of the several principles herein specified to every description of fire-arms.

WILLIAM MUIR, of the Britannia Works, Manchester, engineer and machinist. *Improvements in machinery or apparatus for grinding edge-tools and other articles.* Patent dated March 12, 1853. (No. 621.)

The object of these improvements is to keep the peripheries of grindstones smooth, and in good condition for sharpening tools. This is effected by mounting two grindstones in the same frame, so that they may revolve in contact with each other, or with a piece of stone supported between them. The grindstones are arranged so that one or both of them may have a lateral movement also; and means are provided of bringing their axles nearer to each other as the peripheries of the stones are reduced by wear.

THOMAS SYKES, of Castleford, Yorkshire, gentleman. *Improvements in the treatment of soapy and greasy waters.* (A communication.) Patent dated March 21, 1853. (No. 689.)

The soapy or greasy waters are received into tanks, and have added to them liquid chloride of lime in sufficient quantity to separate the magma or solid parts from the water holding the same in suspension. The mixture is then well agitated, and left to rest for an hour or two, when the clear water is run off, and the thick or muddy residue mixed with sulphuric or muriatic acid, and boiled by introducing steam into it, after which it is filtered, put into bags, and hot-pressed.

Claim.—The treating of soapy or greasy

waters by chlorine, in such manner as to separate the magma and greasy matter therefrom, as described.

MOSES POOLE, of Avenue-road, Regent's-park. *Improvements in generating steam and other vapours.* (A communication.) Patent dated March 21, 1853. (No. 690.)

These improvements consist in bringing water or other liquid in contact with wire-gauze or other form of metal exposing a large surface, such metal having been previously heated by plunging it into a bath of melted metal, or by exposure to a current of hot air; also in injecting water or other liquid into a fused metal, or a heated liquid which is not evaporated with the same facility as water or the liquid being operated on; and also in causing the heated metal or liquid to circulate in tubes inside the boiler.

JEAN MARIE DURNERIN, of Paris, Rue de la Monnaie. *Improvements in apparatus for extracting liquid out of solid substances, specially applicable to the treatment of fatty matters.* Patent dated March 21, 1853. (No. 691.)

Claim.—A mode of separating liquid from solid substances, by forcing them, by means of a force-pump, into a vessel arranged so as to retain the solid portions, and to allow the fluid portions to pass freely away.

MOSES POOLE, of Avenue-road, Regent's-park. *Improvements in obtaining power when air is employed.* (A communication.) Patent dated March 21, 1853. (No. 692.)

The *first* of these improvements in air-engines consists in absorbing the heat given out when the air is compressed by the force or supply-pumps, which may conveniently be done by injecting water in a jet or shower.

The *second* improvement consists in supplying the heat absorbed when the air is expanded in the working cylinder, either by means of a jet of fused metal injected into the cylinder, or by means of wire-cloth, which is heated by being plunged into a bath of melted metal at the bottom of the cylinder, or by heating the air in the passages before arriving at the working cylinder, which may be done by means of heated wire-cloth, or by a jet of fused metal.

The *third* improvement is applicable to close air-engines, and consists in absorbing the heat existing in the air when it has done its work, and before it again enters the force-pump, which may be done by passing the air through wire-cloth, kept cool by means of a current of air or liquid, or by means of a jet of cold water.

The *fourth* improvement consists in passing the air, when it has to be heated or cooled, through a heated or cold grating, formed of strips or ribbons of metal, in place of passing it through wire-gauze similarly heated or cooled.

ISAAC TAYLOR, of Stanford Rivers, Essex, gentleman. *Improvements in machinery for printing woven and other fabrics.* Patent dated March 21, 1853. (No. 693.)

The object of this invention is to facilitate the employment of thin-shell rollers, and generally to improve the process of printing, as performed by the machines now in use.

The employment of thin-shell rollers is provided for by putting the boll, instead of the spindle of the roller, in gear with the driving mechanism, and the "nip" requisite for effecting perfect work is obtained by bringing the engraved roller, with its own weight, and that of the carriage connected to it, to descend freely upon the boll, on a surface or incline more or less vertical, and at such an elevation greater or less above the level of the horizontal diameter of the boll, as shall give it an augmenting lateral pressure inversely as that elevation is less.

JOHN BARSHAM, of Kingston-upon-Thames, patent cocoa-nut fibre manufacturer. *Improvements in apparatus for communicating between the guard and engine-driver, or other persons in a railway train.* Patent dated March 21, 1853. (No. 694.)

This invention consists in fitting railway carriages with adjustable sliding-rods, which can be connected together when the carriages are made up into a train, and by means of a rod or lever, under command of the guard, be made to give motion to apparatus for striking a bell, or exhibiting any signal.

JOHN STATHER, of Kingston-upon-Hull, printer. *Improvements in printing.* Patent dated March 21, 1853. (No. 696.)

These improvements comprehend,

1. A mode or modes of producing blocks, moulds or forms for block or surface printing; and also, 2, a mode or modes of printing letters, figures, or devices upon the surfaces of paper, cloths, and other articles; of which a full description will be given in an early Number.

SAMUEL MCCORMICK, of Fleet-street, Dublin, engineer. *Improvements in manufacturing screw-bolts, spikes, and rivets, and other similar articles, and in the machinery or apparatus used for such manufacture, parts of which machinery are applicable for forming screw-threads, mouldings, and ornaments in metal.* Patent dated March 22, 1853. (No. 698.)

The object of this invention is to make screws, bolts, spikes, rivets, and other articles out of iron or copper when heated to a red heat, and out of softer metals without previous heating, the rod or bar of metal out of which such articles are to be formed being fed into the machinery or apparatus, and operated upon so as to produce the entire screw or piece of ornamented metal,

or formed into a screw-blank or plain shaft with a head upon it, and taken to a separate machine, in order to have the screw-thread or ornament formed or impressed upon its plain surface.

Claims.—1. A general combination and arrangement of parts, by means of which the several operations of feeding-in a bar, cutting off the required length of metal from the bar to form a screw-blank or other required article, heading the same, and discharging it when headed, are performed.

2. The moulding or impressing of a screw-thread or ornament on the plain surface of the screw-blank or shaft, by means of three revolving dies placed triangularly in a suitable frame, and made to revolve so as to produce the results described.

THOMAS BOUCH, of Edinburgh, civil engineer. *Improvements in signals.* Patent dated March 22, 1853. (No. 699.)

This invention relates to signals used on railways, and its essential feature consists in presenting distinctive forms combined with distinctive colours to produce a plainly perceptible signal.

WILLIAM JOHNSON, of Lincoln's-inn Fields, civil engineer. *Improvements in rolling and shaping malleable metals.* (A communication.) Patent dated March 22, 1853. (No. 701.)

The peculiarity of this invention consists in its combining the use of compressing rollers with a revolving die, for the purpose of forming articles in malleable metals, such as railway wheels, tyres, bars, &c.

NICHOLAS G. NORCROSS, of Lowell, Massachusetts, United States. *Improvements in machinery for planing or reducing boards or timber.* Patent dated March 22, 1853. (No. 702.)

The nature of this invention consists in the employment of a cylindrical rotary cutter placed so as to operate on one side of a board for roughing or reducing, and which cuts from the unplaned to the planed surface, in combination with a stationary cutter placed behind and near thereto for finishing without the use of pressure-bars or rollers. The invention also comprises an arrangement for holding the board and moving it under the cutters, and a method of combining two sets of feed-rollers, so that the surplus power of the first set may be received by the second and transferred back to the driving shaft.

FREDERICK FUTVOYE, of Regent-street, merchant. *An improved apparatus to be employed in games of chance.* Patent dated March 22, 1853. (No. 705.)

This apparatus is designed to dispense with the use of dice in the "Racing," "Yachting," and other similar games of chance. It consists of a circular table having a series of numbers or devices ranged round it, and a circular disc or wheel mounted on a spindle in the centre of the table, and also provided with numbers or devices, and with pins or studs at the edge for setting it in motion.

Claim.—The apparatus described, and particularly arranging the course in a circular form on a rotating or stationary disc.

JOHN HENRY PARK, of Preston, civil engineer, and JOSEPH PARK, or Preston, plumber. *Improvements in water-closets and urinals.* Patent dated March 23, 1853. (No. 706.)

This invention consists of particular arrangements of the valvular apparatus of water-closets to insure more perfect flushing of the pans, and prevent waste of water.

BERNARD BOYLE, of Raven-row, Mile-end. *A centripetal flange.* Patent dated March 31, 1853. (No. 708.)

This invention consists of the addition to the present flange of railway wheels of a smaller flange or rim of the same or other material as the wheel. The patentee recommends brass or gun-metal, if added to old wheels, and recommends the vertical position as the best for the wheel and flange at present in use; but his design includes any width and depth of wheel and flange, and all angular deviations from the perpendicular. The use of the flange is, that trains may run at any rate of speed with certainty of safety from running off the track. "It is in fact," as the patentee poetically observes, "the ring that marries speed with safety."

HESKETH HUGHES, and WILLIAM THOMAS DENHAM, both of Cottage-place. *Improvements in pianofortes, organs, seraphines and other like musical instruments.* Patent dated March 23, 1853. (No. 709.)

This invention consists; *first*, of an improved arrangement of the key-boards of the instruments named in the title, whereby the length of such key-boards will be reduced about one-half without impairing or otherwise interfering with the power, touch or tone of the instruments, and whereby a greater range of notes is afforded; and, *second*, in a new arrangement of the action and other parts of pianofortes and other like musical instruments, whereby they may be considerably reduced in width.

WILLIAM MANN CROSLAND, of Beaumont-street, Middlesex, civil engineer. *Improvements in block-making machinery.* Patent dated March 23, 1853. (No. 710.)

The *first* part of this invention relates to the machine employed for boring the pin-hole of blocks and the hole required to ensure the clearance of the tool for forming the mortice or channel for the sheave. The improvements consist; first, in a more ready and correct means of setting the block to

the required position for boring; and second, in the adaptation of a self-acting motion to advance the boring tool to its work with uniform regularity.

The *second* part of the invention consists of an arrangement of machinery for cutting off simultaneously two corners from timber intended for making blocks, the object being to facilitate the subsequent operation of giving external form to the blocks.

The *third* part of the invention relates to the machine for giving external form to the blocks, and consists in arranging the blocks in the machine in such manner that they may be turned on their axes, so as to present different portions of their surfaces to the action of the shaping tool without the necessity for previously stopping the machine or changing the direction of its revolution.

The *fourth* part of the invention has relation to the machine used for slicing the material for the purpose of making the sheaves of blocks, and consists in arranging in this machine two or more saws, so as to cut off two or more pieces at one operation.

ANTOINE FRANCOIS JEAN CLAUDET, of Regent-street, photographic artist. *Improvements in stereoscopes.* Patent dated March 23, 1853. (No. 711.)

This invention comprehends—

1. The application of mirrors to stereoscopes, so as to show the object or image in a natural or non-inverted position.

2. An arrangement of shifting eye-piece, for giving to living objects the appearance of being in motion.

3. A mode of arranging several representations of living objects round a central axis, so that they may be brought in succession under the eye of the observer.

4. Several constructions of folding stereoscopes.

CHARLES WILLIAM SIEMENS, of Adelphi-terrace, Middlesex, and JOSEPH ADAMSON, of Leeds, York, engineer. *Improvements in rotatory fluid-meters.* Patent dated March 24, 1853. (No. 712.)

Claims.—1. The construction of rotatory fluid-meters, with a revolving wheel or wheels connected with a counter, and enclosed in a case, and so arranged that the fluid to be measured flows from the centre towards the circumference, or from the circumference towards the centre of the wheel or wheels.

2. The construction of fluid-meters with a paddle-wheel connected with a counter, and revolving in a chamber containing another fluid which is not miscible with the fluid to be measured.

3. The application to rotatory fluid-meters of vanes or drag-boards.

JOHN BEAUMONT, of Dalton, near Huddersfield, manufacturer. *A new manufacture of certain descriptions of woven fabrics.* Patent dated March 24, 1853. (No. 713.)

This invention consists in manufacturing piled fabrics in the Jacquard loom, by weaving the same in one piece, so that the pile may be cut and withdrawn, and the fabric separated.

WILLIAM PRIOR SHARP, of Manchester, engineer. *Certain improvements in machinery for spinning and doubling cotton and other fibrous materials.* Patent dated March 24, 1853. (No. 714.)

These improvements are applicable to self-acting mules and other machines of a like nature, and comprise—

1. A new combination of parts for governing the position of the fallers, whereby they can be regulated with greater precision.

2. An improved mode of communicating motion to the tin drums by which the spindles are driven.

CHARLES VICTOR FREDERIC DE ROULET, of Paris, late ship-owner. *Certain improvements in the manufacture of piled figured fabrics, by alterations in and additions to looms for weaving; including also a warping-machine, with a method of reading and arranging the colours or materials for the patterns of such figured fabrics.* Patent dated March 24, 1853. (No. 716.)

This invention consists in a method of preparing the threads intended to form the pile and the pattern, separately and independently of the threads of the warp, and uniting them up in the loom, together with certain arrangements of weaving machinery for this purpose, and of warping and other machinery to be employed in connection therewith.

HENRY WEBSTER, of Sheffield, gentleman, and EDWARD DAWSON STONES, of Sheffield, mechanic. *Improvements in the construction of gas-stoves.* Patent dated March 24, 1853. (No. 717.)

The improvements claimed under this patent comprehend—

1. A mode of creating a current of pure air through the stove, and subjecting it to the immediate action of the flame of gas and vitiated heated air.

2. A mode of supplying the air to the jet or burner, and of separating the air to be heated and the heated air from contact with anything calculated to render the same impure.

WILLIAM KEATES, of the firm of Newton, Keates, and Co., of Liverpool, merchants. *Improvements in the manufacture of tubes and mandrils.* Patent dated March 24, 1853. (No. 718.)

Claims.—1. The casting of hollow circular ingots or billets of brass and other alloys

of copper in iron moulds, with iron or steel cores, for the manufacture of tubes therefrom.

2. The rolling of ingots or billets employed in the manufacture of tubes through or between rolls, having grooves of a peculiar form represented and described.

3. The use of mandrils heated to any required temperature when rolling tubes, as described.

4. An improved compound mandril.

CHARLES AUGUSTUS HOLM, civil engineer, of Cecil-street, Strand. *Improvements in propelling vessels.* Patent dated March 24, 1853. (No. 719.)

This invention is designed to reduce or obviate the "slip" experienced with the different forms of screw propellers at present in use. It consists in the application to the screw-blades of curved flanges forming part of the propelling-blades, and placed on two sides of the same, that is, one flange placed at the circumference, and the other at the sternmost edge in the direction of the radius, the two being united at their meeting-point by another curved flange, so as to form a spoon-shaped cavity at the corner of the blade. In addition to these flanges, each blade has also another curved flange at the back, but only at the circumference and in an opposite direction to that in the front part of the blade, by which means the propeller is enabled to be used for backing the vessel when required.

GEORGE ISAAC JACKSON and HENRY DAVID JACKSON, of Castle-street, Liverpool. *Improvements in fasteners for buttons.* Patent dated March 24, 1853. (No. 720.)

This invention consists in combining, by a chain or cord, a series of rings or hooks, each of which has a spring-tongue, and all of which are fixed at intervals, according to the distance of the holes in the garment, or are capable of sliding on the chain or cord, by means of eyes or small rings.

WILLIAM MCNAUGHT, of Rochdale, engineer. *Certain improvements in steam-engines.* Patent dated March 24, 1853. (No. 721.)

The patentee describes and claims:

1. A peculiar arrangement of mechanism for shifting the bowls opposite to the different cams, for the purpose of effecting the cut off when the steam is used expansively, the said mechanism consisting of double-notched inclined planes and chisel-formed or other suitable points connected to the bowls by means of racks and pinions.

2. The connection of each arm of the governor separately to its own notched inclines.

3. A grooved roller or rollers where one cam only is used, for the purpose of preventing the cam from sliding laterally whilst in action against the said rollers.

ROBERT WALKER, of Glasgow, merchant. *Improvements in working and increasing the safety of railways.* Patent dated March 24, 1853. (No. 723.)

The patentee describes and claims:

1. Certain arrangements of apparatus and means to be used in working and increasing the safety of railways.

2. A mode of working railways by means of continuous but disconnected lines of communication, by which the train-conductors are enabled to signal to, or suspend the movement of other trains on their line of rails.

3. An arrangement of the engines of railway trains in such manner that their steam-valves may be closed and the train-brakes put in action, by adjustable or self-acting stops.

4. The application and use on lines of railway of continuous sectional lengths of wire, rope, or other communicating mechanism, whether self-acting or not, for the elevation of stopping catches.

5. The application and use of stopping-catches in combination with signal apparatus, as ordinarily constructed and used.

ROBERT HAZARD, of Lincoln's-inn Fields, warming and ventilating engineer. *A podombroslontron, or an improved apparatus for either sponge or shower-bath, and all other lavatory purposes.* Patent dated March 26, 1853. (No 726.)

This invention consists; *first*, in the construction of sponge or shower-baths, so that they may be collapsed for convenience of portability; and, *second*, in the construction of shower-baths in such manner that a continuous shower of water may be maintained with but slight exertion by the person using the bath.

Claims.—1. The arrangemet of collapsible baths, or shower-receivers, described.

2. A mode of actuating diaphragm or other pumps by the feet, for the purpose of raising water to the rose of shower-baths for lavatory purposes.

THOMAS SMEDLEY, of Holywell, Flint, gentleman. *Certain improvements in steam boilers.* Patent dated March 26, 1853. (No. 728.)

These improvements consist; *first*, in employing a malleable alloy in the construction of steam boilers, and which alloy is subject to less oxidation than iron or copper; and, *second*, in employing such alloy in the construction of the fire-boxes or furnaces of boilers made externally of other metals. The alloy recommended is composed of zinc and copper in proportion not exceeding 45 per cent. of zinc; but that

considered most suitable, consists of 66 parts of copper, and 34 of zinc.

Claim.—The construction of steam boilers (exclusive of locomotive boiler tubes), made wholly or in part of a malleable alloy of copper and zinc, as described.

George Robb, of Glasgow, Lanark, gentleman. *Improvements in the manufacture of sulphuric acid, alkalies, and their salts.* Patent dated March 26, 1853. (No. 731.)

The *first* branch of this invention consists in manufacturing sulphuric acid by passing the vapour of sulphurous acid over peroxide of iron mingled with heated air. In this process the patentee uses the pyrites cinder resulting from the combustion of pyrites as commonly practised, and places this, when reduced to small powder or pieces, in a kiln or furnace, such as is known as a "draw kiln," round which are ranged a set of common pyrites-burners, these burners being so placed that all the products of combustion from them may pass into the kiln containing the pyrites powder. Common pyrites is deposited in the burners and roasted in the ordinary manner, slightly-heated air is at the same time admitted at the bottom of the pyrites kiln, by which arrangement the vapour of the sulphurous acid, and the oxygen of the atmosphere are simultaneously brought in contact with the pyrites in the kiln, which is kept at a dull-red heat, and the resultant combination forms sulphuric acid.

The *second* branch of the invention consists in making sulphate of soda by passing the vapour of sulphurous acid over peroxide of iron and common salt mixed together, and kept at a dull-red heat. In this case the patentee uses the spent pyrites cinder, reduced to a powder, and mixed with common salt, and operates as before described.

The *third* branch of the invention relates to the manufacture of carbonate of soda, by first producing sulphuret of sodium, which is decomposed by the action of carbonic acid. In this process common sulphate of soda is decomposed by the action of carbonaceous materials in a kiln or common furnace; the ordinary materials for the production of sulphuret of sodium are mixed with sulphuret of calcium or soda waste, by which admixture the sulphuret of sodium is produced on a large scale. The subsequent decomposition of the sulphuret of sodium by carbonic acid is performed in the manner usually adopted.

Claims.—1. The general arrangements and means for manufacturing sulphuric acid, alkalis, and their salts, as described.

2. The use of powdered pyrite cinder or peroxide of iron, for the purpose described.

3. The system or mode of keeping up the heat of the kilns, furnace, or operating-chamber, by the use of heated air.

4. The decomposition of common salt in a state of admixture solely with peroxide of iron, or pyrites cinder, by passing the vapour of sulphurous acid through or over such compound.

5. The system or mode of operating upon pyrites for the production of sulphuric acid, wherein the heat involved in the process is solely derived from the combustion of the pyrites.

6. The system or mode of producing sulphuret of sodium by the admixture and use of sulphuret of calcium or soda waste.

PROVISIONAL PROTECTIONS.

Dated August 12, 1853.

1899. Daniel Illel Piosletto, of Crosby-square, London. Improvements in weaving. A communication from Chevalier Gaetano Bonelli, of Turin.

Dated August 24, 1853.

1966. George Culverhouse, of English-street, Hull. Improvements in manufacturing compost or manure.

Dated March 29, 1853.

2002. Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, London, and Rue de l'Echiqpier, Paris, France. Improvements in apparatus for heating. A communication.

Dated September 8, 1853.

2063. Simpson Goy Pape, Gloucester-crescent, Camden-town, Middlesex. Brace-ends, being a new suspender for trousers, breeches, and drawers.

2064. James Gascoigne Lynde, junior, of Great George-street, Westminster, civil engineer. A pressure-governor, or self-acting apparatus for regulating the flow of water.

2066. John Dickinson Brunton, of Truro, Cornwall, engineer. An improved wind-guard or chimney-top.

2067. John Petrie, junior, of Rochdale, Lancaster, ironmonger. Improvements in cans or vessels used for applying oil or other lubricating material to machinery.

2068. James Coate, of Marylebone-street, Regent-street, Middlesex, brush-manufacturer. Improvements in tooth, nail, and hair-brushes.

2069. James Burrows, of the Haigh Foundry, near Wigan, Lancaster, engineer. Certain improvements in the formation or construction of rolled metallic plates.

2070. William Hall, of the Colliery, Castlecomer, engineer. Improvements in the conversion of peat into charcoal.

Dated September 9, 1853.

2074. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. An improved apparatus for facilitating the acquirement of the art of reading. A communication from Messrs. Nicolas Chéron and Florimond Nicolas Tallempin, of Paris, France, manufacturers.

2076. Michael Leopold Parnell, of the Strand, Middlesex, lock-manufacturer. Improvements in the construction of locks.

2078. John Doyle, of Cambridge-terrace, Paddington, Middlesex. The better ventilation of field tents and marquees.

2080. Charles Askew, of Charles-street, Hampstead-road, Middlesex. Improvements in baths.
2082. Jonathan Amory, of Boston, United States of America. Improvements in furnaces.
2084. Henry Woodhead, of Kingston-upon-Hull, cotton-spinner. Improvements in spinning-machinery.
2086. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. An improved manufacture of gas-burner and gas-regulator. A communication.

NOTICES OF INTENTION TO PROCEED.

(From the "London Gazette," September 23rd, 1853.)

727. Alexander Prince. Improvements in carriages. A communication.
986. Richard Johnson. Improvements in machinery or apparatus for drawing wire.
990. John Chatterton. An improvement or improvements in covers for wagons, carts and other vehicles.
1055. William Armand Gilbee. Improvements in apparatus for heating. A communication.

(From the "London Gazette," September 27th, 1853.)

998. George Kennedy Geyelin. Improvements in the manufacture of white oxide of zinc.
1012. Richard Howson. Certain improvements in weavers' harness. A communication.
1028. James Andrew Bruce. Certain improvements in the construction of hay-racks, and other apparatus or apparatuses to contain fodder for horses and other cattle, and also in the method or methods of fastening horses, or other cattle, to prevent their overcasting.
1053. Weston Grimshaw. Certain improvements in slubbing and roving-frames for preparing for spinning cotton, flax, and other fibrous substances.
1062. Auguste Edouard Loradoux Bellford. Improvements in the extraction and manufacture of sugar and of saccharine matters. A communication.
1098. William Edward Newton. Improvements in the treatment of fibrous and other substances, for the purpose of ascertaining the quantity of moisture contained therein. A communication.
1124. Francesco Capeccioni. Certain improvements in the manufacture of candles.
1133. George England. Improvements in screw-jacks.
1152. Alexander Chaplin. Improvements in apparatus for the transmission of aëriform bodies.
1160. Richard Edmondson. Certain improvements in the manufacture of covered corded textile fabrics, and in machinery to be used for that purpose, being applicable either to hand or power.
1178. Charles Pooley. An improved mode of feeding machines for opening, cleaning, blowing, and scutching cotton, and other fibrous substances.
1194. Thomas Stephen Holt. Improvements in steam engines, which improvements are also applicable to the machinery or apparatus connected to steam boilers.
1233. John Oakey. Improvements in reducing emery, glass, and other like substances.
1370. William Edward Maude. Improvements in carriages. A communication.
1371. William Edward Maude. Improved apparatus for steering ships. A communication.
1381. Benjamin Biram. Improvements in working and ventilating mines.
1394. George Basett Colvin Leverson. A new application, construction, and arrangement of springs for carriages and such like purposes. A communication.
1818. James Billings. Improvements in roofing buildings.
1855. William Baines. Improvements in railways.
1870. Richard Farmer Brand. Certain improvements in fire-arms and ordnance.
1872. Henry Moore Naylor. Improvements in affixing postage and other stamps.
1921. Jonh Heritage. An improvement in the manufacture of bricks, pipes, tiles, coping, and such other articles as are or may be moulded in clay.
1963. John Whiteley. Improvements in warp-machinery for the manufacture of textile fabrics.
1967. Benjamin Hornbuckle Hine, Anthony John Mundella, and Thomas Thompson. Improvements in machinery for the manufacture of textile and looped fabrics.
1976. Alfred Beck Tompson. A new or improved spring door-hinge. A communication.
2002. Peter Armand Lecomte de Fontainemoreau. Improvements in apparatus for heating. A communication.
2026. John Macintosh. Improvements in breakwaters.
2032. Augustino Carosio. Improvements in obtaining power by the aid of an electric current, for motive and telegraphic purposes.
2047. Thomas Bollman Upfill and William Brown. An improvement or improvements applicable to metallic bedsteads, couches, chairs, and such other articles as are or may be used for sitting, lying, and reclining upon.
2055. Isaac Smith and Alfred Sommerville. Improvements in metallic pens and pen-holders.
2059. William Joseph Smith. Certain improvements in buttons or other such fastenings, and in applying or affixing them to wearing apparel.
2082. Jonathan Amory. Improvements in furnaces.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed September 24, 1853.

716. Charles Victor Frederic de Roulet.

Sealed September 29, 1853.

743. James Webley.
745. Thomas Hill.
748. Robert Heath.
749. Isaac Rider.
750. Lawrence Frederick Keogh.
755. John Pym.
757. Julian Bernard.
769. Lot Faulkner.
772. Robert McGavin.
774. John Radcliffe.
788. George Robb.
791. Christopher Garman Rosenkilde.
792. Frederick William Mowbray.
794. James Findlow.

797. William Beckett Johnson.
800. George Henry Brockbank.
806. Antoine Burg.
817. William Pidding.
821. William Pidding.
832. William Augustus Pascal Aymard.
833. William Morgan.
835. Frederick William Mowbray.
844. George Frederic Goble.
853. Joshua Farrar.
855. George Frederic Goble.
862. Robert Bostwick Ruggles.
872. Richard Archibald Brooman.
922. Samuel Bayliss.
1015. William Johnson.
1047. Oliver P. Drake.
1049. James Bristow and Henry Attwood.
1122. William Longmaid and John Longmaid.
1151. John Henry Johnson.
1156. Marie Pierre Ferdinand Mazier.
1353. Richard Longden Hattersley.
1656. Andrew Burns.
1697. William Edward Newton.
1698. Edmund Reynolds Fayerman.
1713. Richard Dart.
1738. Frederick Warner.
1740. James Napier Murdoch.
1747. Robert Bitten.
1749. John Ferguson.
1751. William Edward Newton.
1775. James Edward McConnell.
1796. Robert Griffiths.
1814. Charles Frederick Stansbury.
1815. William Sargeant Roden and William Thomas.
1847. William Edward Newton.
1848. William Hickson.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
Sept. 23	3513	William Collimore	Brighton	Crochet Cotton Reel-holder.
24	3514	Thomas Brindley	Finsbury	Spring Bible and Prayer-case.
26	3515	Joseph Chant	Bridgewater	Rib or tooth of crushing-roller.
28	3516	James Barlow	King William-street	Cinder-sifter.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

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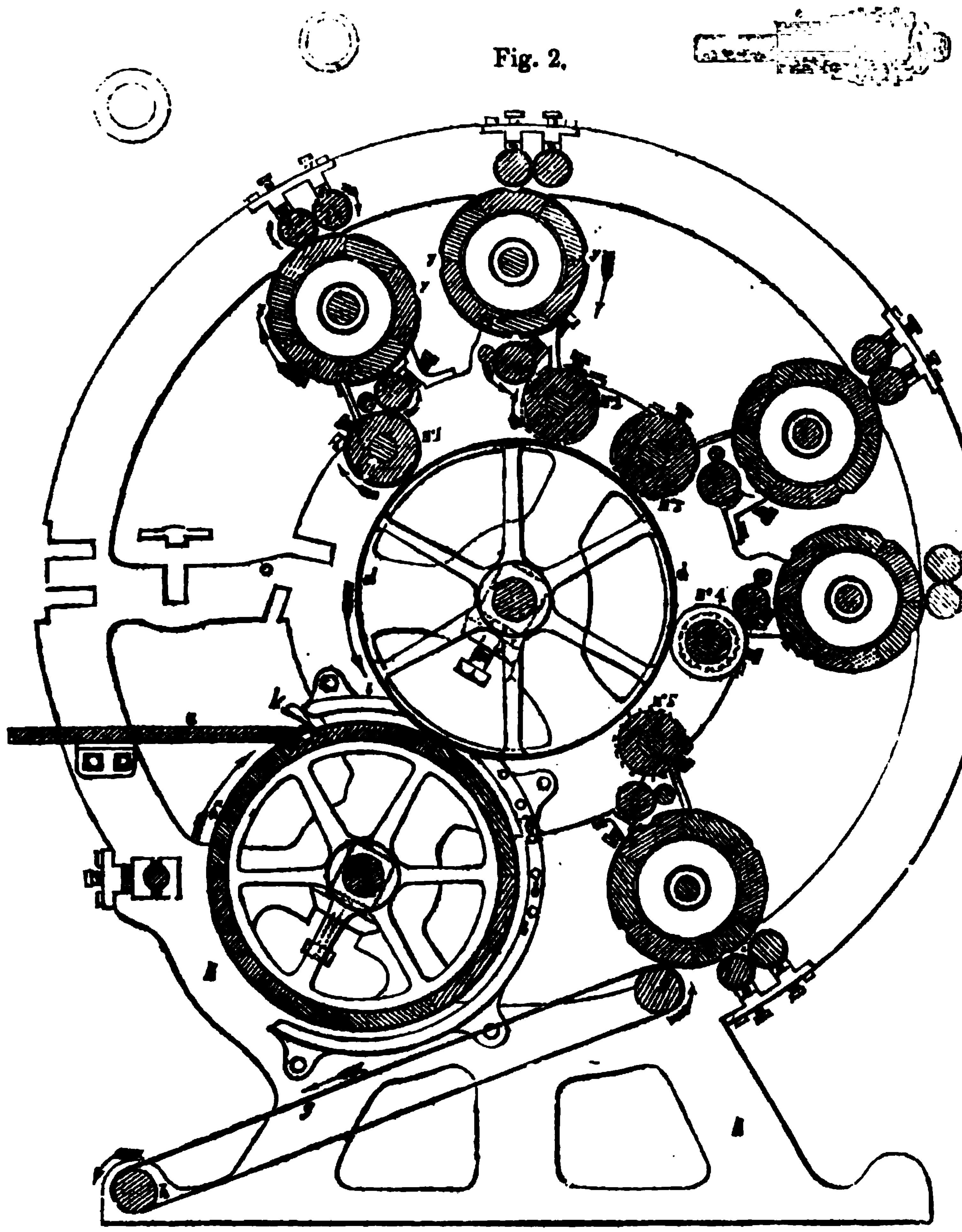
No. 1574.] SATURDAY, OCTOBER 8, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

STATHER'S PATENT SURFACE-PRINTING MACHINERY.

Fig. 3. Fig. 4. Fig. 5.

Fig. 2.



STATHER'S PATENT SURFACE-PRINTING MACHINERY.

(Patent dated March 21, 1853.)

The specification of this patent describes several valuable improvements in the art of block or surface printing, as novel in design, as they are elegant in effect and simple in contrivance. The first of these is a method of producing the blocks or forms for printing from with the letters, figures, or devices to be represented left plain, the surrounding portions being those which are printed; the second is a mode of printing upon paper, cloth, or other articles, by means of a flat plate, upon the surface of which the intended letters, figures, or devices are first printed in an inverted manner, and in one or several colours, and from which they are then transferred to the surface intended to be printed, on which, of course, they will appear in their natural position; and the third is an analogous method of obtaining impressions of figures, letters, or devices, in one or several colours on paper, cloth, or other articles, by first printing the same in an inverted manner upon the surface of a cylinder or roller, by means of several small rollers working in conjunction therewith, and then transferring the impressions from the cylinder to the surface of the paper, cloth, or article intended to be printed. The machinery by which this last improvement is carried into effect is what we are now about to describe.

Fig. 1 of the accompanying engravings is a side elevation, and fig. 2 a vertical section of a printing machine constructed according to Mr. Stather's improvement; figs. 3, 4, and 5 are detached views of parts of a device-roller employed with the machine. In these figures the troughs from which the inking-rollers derive their supply of ink or colour are not shown, but it will of course be understood that they are intended to be furnished to the machine when in operation. A is the framework, which is furnished with suitable bearings for the support of the axes of its several wheels, rollers, and cylinders. *a* is the feeding-board on which the papers to be printed are placed; *b* is a winch for giving motion to the machine, and is fast upon the axis which carries the pinion, B. This gears with the wheel, C, which drives the drum, *c*, which serves both as an entering-drum and pressure-cylinder. The wheel, C, gears with the wheel, D, which drives the principal printing cylinder, *d*, which is designated the receiving or transferring-cylinder, from its receiving impressions on to it and transferring them therefrom. The wheel, D, gears with the several pinions, E, one of which is removed from the figure 1, as also the train of wheels actuated by it, for the purpose of showing the arrangement of the bearings. The pinions, E, drive the primary printing-cylinders or rollers, *e*, which are designated figure or device-cylinders, and also actuate the several trains of wheels, E, E^2, E^3, and E^4, respectively in the order mentioned; and these drive the inking-rollers and cylinders, *e*, e^2, e^3, and e^4 respectively; e^5 is a small inking-roller, which revolves by contact only. One of the wheels, E^3, gears with the pinion, F, which drives the roller, *f*, and this last gives motion to an endless band or delivering apron, *g*, which also works over a loose roller, *h*.

The pressure-drum, *c*, is covered with a blanket, or felt, or other suitable coating, *c* (see fig. 2), a strip along which is removed so that the clip, *k*, which is hinged to the drum may lay flat on it, and not project above the surface of the blanket. The clip is however provided with springs, which keep it up when not forcibly held down on the drum; but during a part of the revolution it is forcibly held down by means of two curved projecting pieces (fixed one at each end of the clip), which work against and in the inside edges of the two closing guides, *l l*, respectively, which are fixed to the framing as shown; *l l* (see fig. 2), are rods across the machine, and between these guides for preventing the tail end of the sheets of paper from getting out of place.

The device-cylinder, *e*, may be made in a variety of different ways. In the fig. 2, the first one on the left (No. 1), is supposed to have a gutta percha surface, and to have the required letters, figures, or devices indented in or upon it. The device-cylinders, No. 2 and No. 3, are represented as having projecting or raised letters, figures, or devices which may be composed either of gutta percha, or of wood or metallic surfaces. The device-cylinder, No. 4, is composed of a series of metal discs placed upon an axis separated by distance washers, or collars, so that by means of such discs lines may be printed upon the transferring cylinder, which shall produce longitudinal lines upon the paper. Figs. 3 and 4 are detached face views of one of such discs; and fig. 5 is an edge view (partially in section) of a few of them placed together and mounted upon an axis. The discs may have letters, figures, or devices upon the edges if desired, or by cutting away portions of their edges broken or dotted lines may be produced. The last device-cylinder, No. 5, is

composed of strips of metal, nicked or let into longitudinal grooves upon the cylinder, whereby lines may be printed upon the transferring cylinder, which shall produce transverse lines upon the paper. The device-cylinders may also be made to produce oblique or slanting lines, whereby a great facility will be obtained in producing checks and plaids, and curved, waved, or angular lines may be introduced if desired. When the device-cylinders are composed of gutta percha, or other non-rigid material, the surface of the transferring cylinder may be composed of polished copper (though Mr. Stather generally prefers printer's composition); but when they are of a rigid or hard material, the surface of the transferring cylinder should be composed of card, drawing-paper, parchment, gutta percha, printer's composition, leather, or some other yielding material.

Fig. 1.

It is particularly to be observed that the device-cylinders and the transferring-cylinder, and their gearing, must be so proportioned as to give the correct longitudinal register of the several devices. A lateral adjustment of the device cylinders is effected in the manner shown by the dotted lines A^r and a^r, the former being a bracketed ring or portion of the framing, and the latter adjusting screws working through it for effecting the movement required. The inking rollers, e^3, are made to have a sliding motion along their axes or spindles (which are feathered to prevent their turning upon them), by means of projecting springs or inclined studs, one at either end, which, as they revolve, strike against the shoulders or projections, which are fixed to the framing, and which are so disposed as to

give the movement alternately in opposite directions, and at the times when two of the four grooves in the cylinders come opposite to the small rollers *e* and e^3, as shown, the object being to effect a more uniform distribution of the ink.

The action of the machine is obvious from the foregoing description. The effect produced is, that the device cylinders become severally inked by their inking rollers, and print their devices on to the transferring cylinder, which transfers the impressions it has received on to the surface of the material, to be printed by the pressure of that material against the surface of the transferring cylinder, which is effected by means of the roller or drum *c*, which works in conjunction with it.

LOCOMOTIVE BOILER EXPLOSIONS.—EFFECT OF RE-MELTING ON IRON.—STEAM AND ETHER ENGINE.—JET PUMP.

(From the *Civil Engineer and Architects'* Report of the Proceedings of the British Association at Hull.)

Mr. William Fairbairn read a paper detailing the results of "Experimental Researches to determine the Strength of Locomotive Boilers, and the Causes which lead to their Explosion:"

These experiments were undertaken in consequence of the explosion of a locomotive boiler in the engine-house of the North-Western Railway Company, at Manchester. It may be remembered that the immediate cause of the explosion was owing to the engine-driver having screwed down the safety-valve whilst he was talking to a companion, and leaving it in that condition. In twenty-five minutes from the time the valve was screwed down the boiler burst with tremendous force, blowing off part of the lofty roof, and killing several men who were within the building. The boiler was a complete wreck, scarcely any portion of it remaining entire. The Government inspector, who examined the wreck of the boiler shortly after the explosion, reported that the stays of the fire-box had been defective, and that the boiler had not been sufficiently strong for the ordinary work. Mr. Fairbairn entertained a contrary opinion, and contended that all parts of the boiler had been strong enough to resist six times the usual working pressure, and that the accumulated generation of steam during the twenty-five minutes that the valve had been screwed down must have amounted to a pressure of 300 lb. on the square inch. The Government inspector, however, maintained that the time was not sufficient to have increased the pressure to nearly that amount. In consequenee of this difference of opinion, a series of experiments were instituted to determine the real causes of the explosion, and to register those facts for future guidance in guarding against such catastrophies. In the first place, Mr. Ramsbottom, the locomotive superintendent, made some experiments with the stays of the burst boiler, from which it appeared that the force required to pull the old stays out of a copper plate (similar to that of the fire-box), into which they had been screwed by *the old threads only*, and not riveted, was 340 lb. on the square inch. Mr. Fairbairn said he had carefully repeated these experiments with nearly similar results; and assuming that the ends of the screws had been riveted, and sound in other respects, it might reasonably be concluded that a strain of not less than from 450 to 500 lb. upon the square inch would have been required to strip the screws or to tear the stays themselves asunder. It should be borne in mind that the exploded boiler, though recently repaired, had been made many years ago, and as the cylinders were only 13 inches in diameter, it had latterly been employed only as a pilot engine to pilot the trains through the Standedge tunnel. The stays were 5 by 5⅝ inches apart, whilst the stays of the boilers at present constructed are thicker and closer together, and form squares of from 4 to 4½ inches, by which increase of strength the resisting power would be raised to nearly 800 lb. on the square inch.

With a view to determine by actual experiment the strength and power of resistance of the locomotive boiler, the Directors of the North-Western Railway Company placed at Mr. Fairbairn's disposal an engine, the exact counterpart of the one that exploded, both having been made at the same time by the same engineers, Messrs. Sharp and Roberts, of Manchester, and both having run the same number of miles. The engine experimented on was not, however, in the same state of repair as that of the exploded one, the fire-box being considerably bulged, and the rivets as well as the stays much weakened. This boiler was subjected to hydraulic pressure, and when 207 lbs. on the square inch had been put upon it, one of the bolts of the cross-bar over the fire-box broke, which caused the experiment to be discontinued, as the leakage was greater than the force-pump could supply. This experiment fully proved that the fire-box stays—on the comparative weakness of which so much stress has been laid—are not the weakest parts of a loco-

motive boiler; and that there is more to be feared from the top of the furnace, which, under severe pressure, is almost invariably the first part to give way. Great care, Mr. Fairbairn said, should therefore be taken in the construction of that portion of the boiler; and the cross-beam should not only be strong, but the bolts by which the crown of the fire-box is suspended should also be of equal strength, in order that no discrepancy should exist, and that all parts should be proportioned to a resisting force of 500 lbs. on the square inch.

The next point to be determined by the experiments was, whether the steam of the exploded boiler could have been raised from a pressure of 60 lbs., at which it blew off from the safety-valve before it was screwed down, to 300 lbs. in the course of twenty-five minutes. Mr. Ramsbottom instituted some experiments on this subject, from which it appeared, that with the furnace in the ordinary condition, steam in a locomotive boiler was raised from a pressure of 30 lbs. on the square inch to 80 lbs. in ten minutes. Mr. Fairbairn repeated these experiments to a still higher pressure with the following results, commencing at forty-four minutes past two o'clock:

Time, h. m.	Pressure, lbs. per square in.	Mean Temperature Fahr.
2 44	11·75	243·00
2 45	14·15	247·75
2 46	16·35	251·25
2 47	19·25	255·25
2 48	22·35	259·75
2 49	25·75	264·00
2 50	28·95	268·37
2 51	32·15	273·00
2 52	35·75	277·00
2 53	39·95	282·00
2 54	44·25	286·37
2 55	48·35	291·00
2 56	52·75	295·37
2 57	57·75	300·00
2 58	63·75	304·25
2 59	68·95	308·75
3 0	75·75	313·00
3 1	80·35	317·00
3 2	87·25	322·10
3 3	93·95	326·12
3 4	101·15	331·00
3 5	108·75	335·62
3 6	111·75	The ther-

mometer did not indicate a higher temperature than the above.

In these experiments, it will be observed, the pressure was raised from 11·75 lbs. on the square inch to 111·75 lbs. in twenty-two minutes; and on looking at the Table it will be seen the pressure was accelerated in a greater ratio than the temperature. In the first experiments, for instance, the increase of pressure was about one pound for two degrees of heat; at a temperature of 277° it was as three to four; at 377°, the pressure increased about a pound for each degree; and at the end of the experiments the proportions as four of heat to five of pressure. Mr. Fairbairn stated that he considered it more than probable that had the instruments been calculated for higher temperatures and higher pressures, the point of explosion from 60 lbs. to 350 lbs. or 400 lbs. on the square inch would have been reached in twenty-eight minutes.

Those parts of a locomotive boiler comprised in the flat surfaces of the fire-box were afterwards put to the test of experiment. Two thin boxes with flat surfaces, each 22 inches square and 3 inches deep, were constructed, one of them corresponding in the thickness of its plates ($\frac{7}{16}$ inch), distance of the stays, and in other particulars, with the sides of the fire-box of the exploded boiler; and the other was formed of plates of the same thickness, but with the stays only 4 inches apart instead of five. The first box, therefore, containing sixteen squares of 25 inches area, represented the exploded boiler; the other, with twenty-five stays of 16 inches area, represented the new construction of boilers. When hydraulic pressure was applied to the first box, not the least swelling of the sides was perceptible till a pressure of 455 lbs. on the square inch had been put upon it, and then the swelling amounted to only ·03 of an inch. At a pressure of 815 lbs. the box burst, by drawing the head of one of the stays through the copper, which, from its ductility, offered less resistance to pressure in that part where the stay was inserted. The swelling of the sides the minute before bursting was ·08 of an inch. In the next series of experiments with the box, in which the stays were placed closer together, the following results were obtained, showing the relative pressures and swellings of the sides up to 1,595 lbs. on the square inch. At a pressure of 1,625 lbs. the box burst, by one of the stays drawing through the plate, after sustaining the pressure upwards of a minute and a half:

Pressure in lbs per square inch.	Swelling in the sides in inches.
485	·04
575	·06
635	·07
755	·08
965	·09
1355	·10
1385	·11
1445	·12
1475	·13
1495	·14
1535	·16
1565	·22
1595	·34

The foregoing experiments Mr. Fairbairn

considered to be conclusive as to the superior strength of the flat surfaces of a locomotive fire-box, as compared with the top or even with the cylindrical part of the boiler. The enormous pressure sustained by the flat surfaces of a fire-box when stayed in the manner now adopted, as exemplified in the second series of experiments, is greater than can possibly be attained in any other part of the boiler, however good the construction; in fact, there is no limit to the pressure that may be sustained if the stays be increased in thickness and in number.

In the discussion which ensued on the reading of this important paper, Mr. Samuelson observed, that as many flat marine boilers are now being constructed, it was desirable that the results of the foregoing experiments should be extensively known, as they would tend to remove the prejudice which had been so long entertained against the use of flat boilers.

In reply to a question, whether the heat requisite to get up a pressure of steam equal to the hydraulic pressure applied might not weaken the iron, Mr. Fairbairn stated, that the effect of heat on the strength of wrought-iron was a subject he was about to investigate, but at present he could not give a definite answer. With respect to cast-iron, he had determined that the strength increased up to a temperature of 300° Fahr., and at higher temperatures it became weakened.

Mr. Hopkinson said, that he understood experiments had been made with wrought-iron in America, from which it appeared that the strength continued to increase to as high a temperature as 600°.

Mr. Fairbairn presented a report of experiments undertaken at the request of the Association, "On the Mechanical Properties of Metals as derived from repeated Meltings, exhibiting the maximum point of Strength and the Causes of Deterioration." In the making the experiments, one ton of Eglinton hot-blast iron was operated on. The proportions of flux and coke at each re-melting were accurately measured, so as to be alike in each. The iron was run into bars 1 inch square, and the trials were made on lengths of about 4 feet, supported at each end, and the weight applied in the centre gradually, until the bar broke. One bar was reserved at each trial, and the rest of the iron was re-melted. This succession of re-meltings and trials was repeated seventeen times, when the quantity of iron was so much reduced, that it was not considered desirable to continue the experiments. The results obtained prove that cast-iron increases in strength up to the twelfth melting, and that it then rapidly deteriorates. The commencing breaking weight was 403 lbs., and this went on increasing until at the twelfth melting the breaking weight was 725 lbs. At the thirteenth it was 671 lbs.; at the fifteenth, 391 lbs.; at the sixteenth, 363 lbs.; and at the seventeenth melting the bar broke with 330 lbs. After the fourteenth melting, the molecules of the metal, when fractured, appeared to have undergone a decided change. There was a bright band, like silver, on the edge of the bar, whilst the middle retained the ordinary crystalline fracture; and in the succeeding meltings the metal was bright all over, resembling the fracture of cast steel. Mr. Fairbairn exhibited specimens of the iron broken at each successive melting, and he said it was his intention to have them analysed to ascertain the chemical change that had been effected by the repeated processes.

Mr. G. Rennie made a communication "On the Combined Steam-and-Ether Engine," a French invention applied to propel a ship from Marseilles to Algiers, which he had lately examined. Mr. Rennie had been requested to investigate the working power of this engine, and, accompanied by his son, he made a voyage in the vessel from Marseilles to Algiers and back. The engine was originally intended to be worked by steam, and the boiler is adapted to an engine of 30-horse power. The principle of the construction as it is now worked is this:—The heat given out by the steam in condensing is applied to boil ether; the vapour thus generated is admitted into a distinct cylinder, and the work it does is so much gained from the waste heat of the steam. The condenser is surrounded by tubes containing the ether, which thus aids in condensing the steam; and as ether boils at a temperature of 100° Fahr., there is a tolerably efficient condensation of steam produced by the temperature at which the ether boils. The ether, after having done its work in its separate cylinder, is condensed in a refrigerator surrounded by cold water, and it is then again in a state to act as a condenser of the steam. The loss of ether vapour by leakage during this repeated vaporisation and condensation, amounts in value to one franc per hour. Special arrangements are made for dissipating the vapour that escapes, so as to prevent ignition, and with that provision Mr Rennie considers there is no danger. In the return voyage, Mr. Rennie placed the coal under lock and key, and superintended the delivery of it, so that no deception might be practised, and he estimates the saving of fuel from this combination of ether with steam at nearly 70 per cent. It had been estimated by a French commission at 74 per cent. The French government have paid the inventor,

M. Dutromblet, a large sum for the invention, and are about to put it in operation in a ship of 1,500 tons burthen, with engines of 150-horse power, which will have the advantage of the experience gained during the working of the present engine.

Mr. Taylor, jun., the son of the engineer who constructed the engine of the Marseilles boat, said that there were many defects in the present arrangement which would be remedied in the engines about to be made. The condensers are at present very imperfect, and do not expose a sufficient surface.

Mr. Sykes Ward said, that good ether does not corrode metals, therefore there could be no objection to the employment of it on that account. The attempts that had previously been made to apply spirituous vapour as a motive power necessarily failed; because though alcohol and ether boil at a much lower temperature than water, their vapours are much heavier, and carry off as much heat at a given pressure, when applied, as steam.

Mr. Fairbairn stated, that in the best Lancashire steam-engines, when working expansively, 2¼ lbs. of coal per horse-power is the quantity consumed, which was nearly equal to the quantity consumed during the voyage from Algiers to Marseilles—whilst some of the steamboats on the Humber burn 10 lbs. of coal per horse-power; therefore, compared with that wasteful expenditure of fuel, the steam-and-ether engine presented great advantages.

Other members spoke encouragingly of the combined power, though the condensation of the steam it was considered must be imperfect, as the vacuum is not good at a temperature higher than 90°.

Mr. Thomson read a paper "On an Experimental Apparatus constructed to determine the efficiency of the Jet-Pump, and a series of results therefrom." The construction and action of the jet-pump were explained in our report of the proceedings of the British Association at Belfast. Mr. Thomson employs a jet of water issuing into a larger tube to produce an elevating force which raises water from a considerable depth. The original intention was to employ this pump only to empty the wells of his vortex water-wheels, but it appeared from a series of experiments made to determine its efficiency, that it is capable of being advantageously applied in many circumstances to the draining of marshes. The effect of its action is different from that of the water-ram, for whilst that applies a current to force a small quantity of water to a great height, the jet-pump applies the same force to lift a larger quantity from low levels. In these situations where a river or brook runs near marshy land, the stream might be applied effectively to drain the marsh; and in rainy seasons, when there would be more water collected, the force of the current and its efficiency in draining would also be proportionately increased. The following Table, derived from a series of experiments, shows the quantity of water raised proportioned to the height:

Rates of lift to fall.	Quantity lifted if the water supplying the power is 100.	Mechanical work performed in the raising of water if the work due to fall is 100.
0·1	65·0	6 5
0·2	51·0	10·3
0·3	44·0	13·2
0·4	37·0	14·8
0·5	33·0	16·3
0·6	29·0	17·3
0·7	26·0	18·1
0·8	23·0	18·2
0·9	20·0	18·1
1·0	18·0	18·0
1·1	16·0	17·9
1·2	15·0	17·6
1·3	13 0	17·3
1·4	11·5	16·3
1·5	10·2	15·3
1·6	9·0	14·2
1·7	7 7	13·2

HUGHES AND DENHAM'S PATENT PIANOFORTES, ORGANS, AND SERAPHINES.

A short notice of these improved instruments was given among the abstracts of specifications in our last Number. We now supply a further account of the invention, which appears to possess singular merit. The key-board arrangement is especially valuable in the case of pianofortes, as by it instruments of great compass may be produced, which at the same time will not occupy above half the space of the ordinary "cottage" instruments.

The engraving is a section of so much of a pianoforte of the ordinary construction as is necessary to explain the patentees' improved arrangement of the key-board and balance levers. A A′ are the notes of the diatonic scale, which are arranged in such a manner that the keys A′ are slightly raised above the notes A, and are also placed at the back thereof; the balance levers, B B′, are covered in front, as represented, and weighted, in order to equalize their action upon the hammers of the pianoforte, the valves of the organ, or the levers for admitting the wind to notes of the seraphine, harmonium, and other similarly constructed instruments. C C are the notes

which form the chromatic scale, and C′ their balance levers. It will be seen that by this method the notes of the diatonic scale are arranged in a series of thirds instead of seconds, as in instruments of the ordinary construction; but the inventors do not confine themselves to this particular arrangement. In some cases they mingle the chromatic with the diatonic notes in their proper position, and by this arrangement the pedal pipes of the organ may be introduced into the key board, so as to bring them more immediately under the control of the performer.

Another part of the invention consists in curving the back and sounding-board of pianofortes, and in arranging the wires and action in a similar curve, whereby the width of the instrument is materially reduced, while the balance-levers may be arranged parallel to one another, the notes of both the diatonic and chromatic scales being placed in the manner before described and represented in the engraving.

KUKLA'S PATENT GALVANIC BATTERIES.

The following additional particulars in reference to Mr Kukla's galvanic arrangements, noticed *ante* p. 94, will be found interesting:

The combination used in one of these is antimony, or some of its alloys, for a negative plate, with nitric acid of specific gravity 1·4 in contact with it, and unamalgamated zinc, for a positive plate, with a saturated solution of common salt in contact with it. A small quantity of finely-powdered peroxide of manganese is put into the nitric acid, which is said to increase the constancy of the battery. The alloys of antimony which Mr. Kukla has experimented with successfully are the following:—Phosphorous and antimony, chromium and antimony, arsenic and antimony, boron and antimony. These are in the order of their negative character, phosphorous and antimony being the most negative. Antimony itself is less negative than any of these alloys. The alloys are made in the proportions of the atomic weights of the substances. All these arrangements are said by Mr Kukla to be more powerful than when platinum or carbon is substituted for antimony or its alloys. In this battery a gutta-percha bell-cover is used over the antimony, and resting on a flat ring floating on the top of the zinc solution, this effectually prevents any smell, and keeps the peroxide of nitrogen in contact with the nitric acid solution. When a battery of twenty-four cells was used, Mr. Kukla found that in the third and twenty-first cells pure ammonia in solution was the ultimate result of the action of the battery; but only water in all the others. This experiment was tried repeatedly, and always with the same result. A battery was put into action for twenty-four hours; at the end of that time the nitric acid had lost thirteen-twentieths of an ounce of oxygen, and one quarter of an ounce of zinc was consumed. Now as one quarter of an ounce of zinc requires only 0·06 of an ounce of oxygen to form oxide of zinc, Mr. Kukla draws the conclusion, that the rest of the oxygen is converted directly into electricity; and this view, he says, is confirmed by the large amount of electricity given out by the battery in proportion to the zinc consumed in a given time. In the above battery each zinc plate had a surface of forty square inches. The addition of peroxide of manganese does not increase the effect of the battery, but it makes it more lasting; the peroxide of nitrogen, formed in the bell-cover, taking one atom of oxygen from the peroxide of manganese; this is evident from only the oxide of manganese being found in the battery after a time: in the salt solution no other alteration takes place than what is caused by the oxide of zinc remaining in a partly dissolved

state in the solution. For this battery Mr. Kukla much prefers porous cells, or diaphragms of biscuit ware, as less liable to break, and being more homogeneous in their material than any other kind. This battery is very cheap, antimony being only 5d. per lb., wholesale, and the zinc not requiring amalgamation. The second arrangement tried by Mr. Kukla was antimony and amalgamated zinc, with only one exciting solution, viz., concentrated sulphuric acid; this battery has great heating power, and the former great magnetising power; it, however, rapidly decreases in power, and is not so practically useful as the double fluid battery, which will exert about the same power for fourteen days, when the poles are only occasionally connected, as in electric telegraphs. Certain peculiarities respecting the ratio of intensity to quantity when a series of cells is used, have been observed, which differ from those remarked in other batteries. Mr. Kukla, on directing his attention to the best means of making a small portable battery for physiological purposes, has found very small and flat Cruikshank batteries, excited by weak phosphoric acid (one of glacial phosphoric acid to twenty of water), to be the best. Phosphoric acid being very deliquescent, and forming with the zinc, during the galvanic action, an acid phosphate of zinc. A battery of this description does not decrease in power very materially until it has been three hours in action.—*Athenæum.*

ADMIRALTY EDUCATION.

Sir James Graham has now altogether abolished the School of Mathematics and Naval Construction, Portsmouth, of which, during the five years of its existence, the Rev. Dr. Woolley was the Principal. It had been long announced by the Admiralty, that in September Dr. Woolley would be advanced to another office, and that the government of the Central School would be transferred to one of the Dockyard schoolmasters, Mr. Rawson, of Portsmouth. We are informed that this announcement excited but little surprise among those who are familiar with the more secret influences which often prevail at the Board of Admiralty. Among such persons the arrangement, so far as regards Mr. Rawson's appointment, is said to have been originated by Mr. Fincham, and to have been a cherished scheme from even before the foundation of the school. It appears, moreover, to be the opinion of such persons that the anxiety of Mr. Fincham to effect this purpose, (an anxiety quite inexcusable on public grounds), has manifested itself in an unjustifiable opposition shown by him to the late students of the College, and has been the real cause of the final abolition of the Institution, although Sir J. Graham is of course responsible for the act. If this be true, we can but regret that the prejudices of personal relationships should be permitted to exercise such injurious effects upon the public institutions of the country. Every one acquainted with the circumstances of the case saw the blundering and fatal character of the arrangement; and even the newspaper reporters, remarking the strange folly of the proposed change, sought to gloss it over before the public by voluntarily bestowing upon the gentleman who was to succeed as Principal of the Institution an imaginary Professorship, and announced that "Professor Rawson" was named as the future principal of the College; for which the reporters doubtless deserve at least the praise of having sought to make the best of an unwise measure. However, a change that required such scheming for its justification was unworthy of the Board of Admiralty; and the First Lord has arrived at the same opinion, and seems to have concluded that the Science of Naval Architecture might be expected to receive but little advancement when entrusted to the care of persons who fill the position of ordinary schoolmasters in a dockyard. But Sir James Graham, instead of retracting an error, has annihilated the Institution. This act certainly seems to partake more of rashness than of wisdom. Once again Sir James has set aside the only Institution in which the government of this country fostered the science of Naval Architecture with reasonable hopes of success. The measure is not one that can gain him praise, even as an economist; for he is an unwise financier who makes his earliest retrenchments to the detriment of an important science. By terminating a single sinecure he might have saved the entire cost of the College, which, in its first form, allowing a somewhat longer period of study to the pupils, would have supplied improvements to naval architecture, and such a class of officers to the service of the country as will be furnished by no other arrangements.

We prefer, however, that the school should be thus set aside, rather than take the proposed form before referred to. Before the higher problems that occur in the abovenamed science can be investigated, a great variety of mathematical subjects have to be thoroughly studied, as is well known. In the time allowed for the preparation of these, Dr. Woolley would probably succeed in making at least the more ready of the pupils proficient; but this could hardly be

expected of a mathematician of less eminence, and certainly could not be looked for from the schoolmasters of the dockyards, of whom there is probably not one who has studied for an hour in a university.

Sir James Graham has at least saved himself and his colleagues from the indignity consequent upon making a change that could not have been considered other than rash, and injurious to the service; but we fear he has also incurred the blame of having rescinded one of the best regulations of a former administration.

We understand that the pupils belonging to the school at the time of its discontinuation have been removed to a kind of upper class in the Portsmouth Dockyard School. We think it would have been more wise of the Admiralty to have avoided the inconvenience of causing these students to feel the painful contrast of their past with their present opportunities, by dispensing altogether with this latter arrangement.

RISING OF WATER IN SPRINGS BEFORE RAIN.

The following is an abstract of a paper on this subject, by Professor Brocklesby, of Connecticut, read before the American Association for the Advancement of Science:

"In the westward portion of the town of Rutland, Vermont, is a lofty hill, rising to the height of about 400 feet above the Otter Creek Valley. Near the summit of the hill a small spring bursts forth, the waters of which are conveyed in wooden pipes to the barn-yards of two farm-houses, situated on the slope of the hill; the first being about a quarter of a mile distant from the spring, and the second nearly one-third of a mile. At the latter house Professor Brocklesby once resided.

The waters of the spring are not abundant, and during the summer months frequently fail to supply the aqueduct. Such was the state of the spring when he arrived at Rutland, for the summer had been extremely dry, the brooks were unusually low, and the drought had prevailed so long that even the famed Green Mountain had in many places begun to wear a russet livery. The drought continued, not a drop of rain falling, when one morning the servant, coming in from the barn-yard, affirmed that we should soon have rain, as the water was flowing in the aqueduct, the spring having risen several inches. The prediction was verified, for within two or three days rain fell to a considerable depth. In a short time the spring again sank low, and ceased to supply the aqueduct; but one cloudless morning, when there were no visible indications of rain, its waters once more rose—flowing through the entire length of the aqueduct—and ere twenty-four hours had elapsed, another rain was pouring down upon the hills. On inquiry, it was ascertained from the residents in the vicinity that the phenomenon was one of ordinary occurrence, and that, for the last twenty years, the approach of rain was expected to be indicated by the rising of the spring.

Interested by these facts he sought for others of the like nature, and requested through the public prints information on this subject from all who happened to possess it,—and also collateral points which were conceived to have important relation to this phenomenon. He was rewarded by the knowledge of only one additional instance, existing in Concord, Massachusetts, where a spring that supplies a certain brook is said to rise perceptibly before a storm. Mr. Munroe, who lives near the stream, afforded the following information:

"The subject has not, so far as we are aware, fallen under the notice of any close observer of the facts you inquire about; the most that is known being this: that the bed of the brook, during a long drought, having become dry, the stream is known to start again before any rain, and the belief is that rain is to be looked for immediately upon the appearance of Dodge's Brook."

The cause of this phenomenon has been attributed by some to the fall of rain at distant sources of the spring previous to its descent in the vicinity of the spring itself; but he believed the true solution was to be found in the diminished atmospheric pressure which exists before a rain.

The waters of a spring remain at any given level, because the atmospheric and hydrostatic pressure combined, exactly counterbalance the upward force of the jet. The spring will, therefore, rise either when the force of a jet is increased, while the atmospheric pressure continues the same, or when the latter is diminished, while the former remains constant; and the elevation is greatest of all when the decrease in the density of the atmosphere occurs simultaneously with an increase in the strength of the jet.

If the explanation given is correct, we arrive at the curious discoveries that the springs and fountains of the earth are natural barometers, whose indications may perhaps be worthy of notice in future physical investigations.—*Scientific American.*

SPECIFICATIONS OF PATENTS RECENTLY FILED.

James Worrall, of Salford, Lancaster, dyer and finisher. *Certain improvements in the method of preparing, treating, and finishing cut piled, or raised fustians and other similar goods or fabrics, and in the machinery, or apparatus connected therewith.* Patent dated March 26, 1853. (No. 732.)

This invention consists principally in the introduction of certain novel processes, by which means the pieces may be "dyed up" or printed, previous to the pile or nap being cut, and the stiffening, and consequent scouring or cleansing may be dispensed with. The mode in which the patentee proceeds is as follows:—1. The cloth is padded or impregnated with oil, grease, soap or fatty matter, and afterwards dried over steam cylinders, or in a stove. 2. The face of the cloth is hardened and singed by passing over a red-hot singeing plate. 3. The pieces are folded and placed in a steaming apparatus of improved construction, without being in contact with each other, and there subjected to the action of steam, and boiling in an alkaline ley; after which they are washed and deprived of their superfluous moisture. 4. The pieces are padded with chloride of lime and bleached in the usual manner. 5. After being dried, the pieces are padded with a mordant composed of gelatine with a solution of copper, iron, tin, &c., and then printed, or dyed up. 6. The cloth is stretched and the pile cut, or the napped surface raised, the back having been previously "perched," if required. 7. If an extra "feel," or "handle," is required, the cloth is again stiffened. 8. The pile or nap on the face and back of the fabric must now be dressed or raised, and the face shorn off by the usual machinery.

Claim.—The improved method of preparing, treating and finishing, cut piled, or raised fustians, and other similar goods or fabrics as described, more especially the dyeing or printing the piece, previously to cutting or raising the pile, and the improved apparatus connected therewith.

George Oakes Asbury, of Birmingham, manufacturer. *An improvement or improvements in the manufacture of dowels used in joinery.* Patent dated March 28, 1853. (No. 733.)

Mr Asbury's improved machine is intended for the manufacture of dowels from rods of iron. The end of a rod is fed into the machine, where it comes under the action of a pair of dies, by which it is compressed to a tapered form, and on being further inserted, the rod passes under the action of other dies, which complete the first dowel and commence a second; the finished one is then cut off, and the operation continued as before.

Claim.—The making of dowels by the action of dies and a cutter.

John George Truscott Campbell, of Lambeth-hill, Upper Thames-street, grocer. *Certain improvements in ships' propellers.* Patent dated March 28, 1853. (No. 734.)

This invention consists of an improved construction of propeller, which the patentee terms the "Curvilinear Propeller." The form of this instrument is determined by "a line traced upon the surface of two cones fixed base to base, the said line to commence at the base of the cones, and reversely make one revolution around each cone towards their apex, and if the adjacent parts be carved out so as to allow the inner part of the leaf to form a straight line, and to rest longitudinally upon the upper part of the axis or shaft, it will form a leaf totally distinct from the worm of a screw; for as the screw is generated by a spiral line placed around a shaft, so is the curvilinear generated from a straight line placed longitudinally upon the upper part of a shaft."

The patentee describes several modified forms of his propeller, and claims generally the construction of the same on the principles set forth.

David Stephens Brown, of Alexandrian Lodge, Old Kent-road, gentleman. *Certain improvements in engines to be worked by steam or any other elastic fluid, which invention also includes the apparatus for generating such steam or other elastic fluid.* Patent dated March 28, 1853. (No. 735.)

This invention consists in "confining the steam or other elastic fluid in an air-tight flexible or elastic bag or tube, when used either with or without a cylinder," the expansion and contraction of the elastic bag or tube, when the steam is admitted and allowed to escape, producing a reciprocating motion, which can be applied to drive machinery through the medium of a crank in the usual way.

Augustin Chrysostom Bernard, and Jacques Marie Pierre Alberic de St. Roman, of South-street, Finsbury, gentleman. *An improved mode of giving publicity.* Patent dated March 28, 1853. (No, 736.)

The character of the improvement proposed by the patentees will be readily seen from the claim, which is for the application of glass, or some transparent water-tight fabric for the construction of the parts of advertising carts and vans, upon which advertisements are set, and which are usually made of wood, for effecting perambulating sight publicity.

Thomas James Perry, of the Losels, Aston-juxta-Birmingham, engine turner.

Improvements in printing. Patent dated March 28, 1853. (No. 737.)

Claim.—The constructing of printing types with angular or other elevations and depressions on their opposite sides, so that the said types when set up shall interlock by the said elevations engaging in the said depressions.

John Scott, Jun., and George William Jaffrey, both of Greenock, Renfrew, North Britain, engineers. *Improvements in steam engines.* Patent dated March 28, 1853. (No. 738.)

These improvements relate more especially to engines employed for screw propulsion. The patentees make the condenser the basis of the engine frame, and place the two cylinders on it. These are inverted and set at an angle of about 45°, and their pistons have each two rods united to a single cross-head working in guides bolted to the cylinder covers. From each end of this cross-head a connecting-rod passes to an overhead first-motion shaft, carrying two large spur-wheels, at some distance apart on the shafts. On the outside of each of these spur-wheels is a crank pin, and the two opposite rods on each side of the engine are jointed to the same pin. The spur-wheels gear respectively with two pinions on the propeller shaft, which runs along the keel line beneath the condenser. The air-pumps are both on one side of the engine; they are on the trunk principle, and worked from one of the crank-pins by a single large eccentric. Each trunk-plunger has a radius bar as a guide, and this bar answers as well to work the feed and bilge-pumps beneath.

The claims embrace the combined arrangement and the modes of working the air and minor pumps.

Samuel Fox, of Stockbridge Works, Deepcar, near Sheffield. *An improvement in the frames of umbrellas and parasols.* Patent dated March 28, 1853. (No. 739.)

This improvement is designed to give additional strength to the joints by which the stretchers of umbrellas and parasols are connected to the ribs; and it consists in providing the stretcher at its end with three projections, one to enter between the strap or middle bit, which embraces the rib, and the others to come outside the ends of the strap, the wire or pin which makes the connection passing through the whole.

George Edward Dering, of Lockleys, Hertford. *Improvements in preserving, or preventing decomposition in vegetable and animal substances and matters.* Patent dated March 28, 1853. (No. 740.)

This invention consists in applying the salts and matters produced in the working of galvanic batteries to the purpose of preserving or preventing decomposition in animal and vegetable substances, in place of using the metallic salts usually employed, dissolved for these purposes; also in deodorizing fecal matters by the same means, for the purpose of preventing effluvia, and rendering them useful as manure.

George Edward Dering, of Lockleys, Hertford. *Improvements in the manufacture of certain salts and oxides of metals.* Patent dated March 28, 1853. (No. 741.)

The improvements claimed under this patent relate to the treatment of the saline solutions obtained by the working of galvanic batteries; and consist in obtaining metallic salts from such liquids in a state of partial saturation, by subjecting the same to the process of evaporation; also, in causing such liquids to be fully saturated, or nearly so, by the introduction of similar or other salts or matters before evaporation, and in certain other modes of treating such liquids to obtain salts therefrom; and finally, in producing oxides by treating the salts obtained as aforesaid by exposure to heat, or by the addition of alkali or ammonia, or other equivalent substance.

James Webley, of Birmingham, manufacturer. *Improvements in the construction of repeating or revolving and other pistols and fire-arms.* Patent dated March 29, 1853. (No. 743.)

These improvements comprehend—1, a peculiar action or mechanism for the lock of repeating pistols and other firearms; 2, a method of connecting the barrel to the frame; 3, a method of preventing the complete withdrawal of the bolts of firearms; and 4, the making of the middle part of the axes of revolving firearms of a square or prismatic figure.

Luke Smith, of Littleborough, Lancaster, mechanic, and Matthew Smith, of Heywood, mechanic. *Improvements in machinery for weaving and printing.* Patent dated March 29, 1853. (No. 744.)

These improvements consist—1, in winding the binding warp and the warp for the back cloth of fustians on separate beams; 2, in an improved mode of applying the swell to shuttle-boxes, so as to enable the same swell to act on two or more shuttles in the same box; 3, in an improved weft stopper; 4, in the application of a spring to the underside of the lay bottom or elsewhere, so as to act on the picking-stick, and prevent rebounding of the shuttle; 5, in an improved combination of machinery for weaving terry or looped fabrics without wires, a portion of the terry warp being caught hold of by the crossing of the binding warp and the weft, and formed into a loop or terry by the beating up of the reed; 6, in another improved combination of ma-

chinery for weaving terrry or looped fabrics, in which the depth of the loops or terries is determined by a series of flat wires passing between the dents of the reed; 7, in the application of three shuttles traversing the warp at the same time for weaving certain descriptions of fabrics; and 8, in an improved mode of constructing the blocks used in printing warps, so as to enable the pattern to be changed.

THOMAS HILL, of Southampton, gentleman. *Certain improvements in springs, and also in the modes of their application to railway engines and carriages.* (A communication.) Patent dated March 29, 1853. (No. 745.)

These improvements consist in forming springs by laying together a number of plates of steel, the ends of which are clipped or held together by buckles, rivets, bolts, or soldering, and then bending up these plates into a serpentine or other curved form. These springs are applied as buffer and bearing springs for railway carriages, and in the former case they may be so placed as that both buffers may act on the same spring.

SAMUEL NEWTON, of Stockport, Chester, cotton manufacturer. *A self-acting friction break, to be applied to engines, carriages, and wagons used in railways.* Patent dated March 29, 1853. (No. 746.)

In Mr. Newton's arrangement, the naves of the wheels are each furnished with a friction-wheel, which is embraced loosely by a friction-strap, made fast at one end to some portion of the framing, and connected at the other end with a weighted lever, which is ordinarily kept raised; but when the break is required to be applied is allowed to drop, so as to cause the band to clasp the friction-wheel, and thus retard the motion of the carriage. All the levers of the carriages comprising a train are connected with a single lever arrangement, under control of the guard, by means of which all the breaks can be simultaneously brought to bear on their respective wheels.

Claim.—The adaptation and application of the clamp-break, combined with the friction-wheel to railway carriages, so as to constitute a self-acting friction-break for such carriages.

HENRY LEE CORLETT, of Summer-hill, Dublin, gentleman. *Improvements in railway wagons.* Patent dated March 29, 1853. (No. 747.)

These improvements relate to hopper wagons, and consist of an improved arrangement of the flaps thereof, so as to enable their contents to be discharged at any particular spot desired, either at the centre or sides of a line of rails while such wagons are on the rail, and either at rest or in motion.

ROBERT HEATH, of Betley, Stafford, *Improvements in railway breaks and signals.* Patent dated March 29, 1853. (No. 748).

These improvements consist in the use of a lever and weight, for the purpose of applying railway carriage breaks. Each break of the carriages composing a train is furnished with an arrangement of this kind; and when the breaks are not required to be in contact with the peripheries of the wheels, the weighted ends of the levers are kept raised by means of chains; but when the breaks are to be put on, the chains are released, and the breaks immediately brought against the wheels with a degree of force corresponding to the leverage exerted.

ISAAC RIDER, of Bristol, Somerset, brass-founder. *Improvements in cocks for drawing off beer or other liquids.* Patent dated March 29, 1853. (No. 749.)

Mr. Rider's improved arrangement relates to cocks in which a key is used for opening the fluid-passage. The plug or valve works in a horizontal position against its seating, india-rubber being interposed to make a tight joint, and is moved away so as to allow the fluid to pass through by means of a key, the bit of which is cam-formed and acts on the head of the stem of the plug.

LAWRENCE FREDERICK KEOGH, of Liverpool, Lancaster, cotton-broker. *Improvements in looms for weaving.* Patent dated March 29, 1853. (No. 750.)

This invention refers to a method of weaving two or more pieces of goods in a loom at the same time, and consists in adapting to the machine a series of shuttle-races and other necessary parts placed one above another, according to the number of pieces of cloth intended to be produced. Each of the races is provided with a separate shuttle or shuttles, driven in any ordinary way, and mounted upon suitable reciprocating parts for effecting the beating-up.

Claim.—"The application of two or more sets of apparatus situate one above another, each capable of producing a piece of goods."

JOHN PYM, of Pimlico, Middlesex, gentleman. *Improvements in the permanent-way of railways.* Patent dated March 29, 1853. (No. 755.)

The inventor constructs the sleepers of earthenware, slate, stone, or other suitable materials, and forms them hollow instead of solid as heretofore; and in order to prevent "sopping," he perforates the bottom or sides, to allow the water to enter the interior chamber, and to run off at either end. When it is not desirable or practicable to

fix the chairs upon the sleepers, according to the methods now in use, the inventor forms the sole of the chair sufficiently long to overlap the sides or edges of the sleeper, and secures the ends of the sole by passing a bolt from side to side through the sleeper, and fastens the same by a nut, pin, or rivet. Wood, felt, or other suitable material is placed between the chair and the sleeper.

Claims.—1. The construction of hollow perforated sleepers.

2. The construction of sleepers of slate and earthenware.

3. The construction of chairs, and the mode of fastening them, as described.

JULIAN BERNARD, of Guildford-street, Russell-square, Middlesex, gentleman. *Certain improvements in boots, shoes, and clogs, and in the machinery or apparatus and materials connected therewith.* Patent dated March 29, 1853. (No. 757.)

This invention relates:

1. To certain self-acting mechanical arrangements for inserting screws into the soles and heels of boots and shoes, for the purpose of attaching such parts to the upper and inner soles; part of which arrangements is applicable to the driving of pegs, nails, or similar fastenings.

2. To mechanical arrangements for hammering or beating the leather used for the soles and heels of boots and shoes, and to the combining of two or more hammers in the same framing.

3. To certain arrangements for cutting or puncturing the parts of boots and shoes.

4. To certain methods of attaching the outer-soles and heels, by any suitable adhesive substance.

5. To a mode of levelling or reducing different parts.

6. To the application of steam to the heating of various parts and implements used in the manufacture of boots and shoes.

7. To a method of drying boots and shoes, by means of heated air or steam, in suitable chambers.

8. To a mode of heating the counters of boots and shoes, and securing them to the other parts.

9. To the use of wooden heels charged or impregnated with caoutchouc or gutta percha.

10. To a method of charging the heels and other wooden parts of clogs with caoutchouc or gutta percha.

LOUIS MICHEL LOMBARD, of Paris, France, barrister-at-law. *Improvements in obtaining motive power.* Patent dated March 30, 1853. (No. 761.)

This new motive power is said to result from the effect of equal weights acting one upon another, being obtained principally by means of one of the weights losing all or a part of its force, by dividing its action and by causing it to balance itself, in consequence of which it can be easily raised by another opposite weight which possesses all its force. The excess of the force of one of the weights above that of the other is then susceptible of becoming motive power. The inventor describes a method of applying the system to an alternate and continuous motion, by connecting three equal weights in such manner that two of them together shall cause the third to oscillate continually with double their own velocity, at the same time producing a surplus power which is to become motive power.

JAMES BOWRON, of Tyne and Tees Glass Works, South Shields. *Improvements in the manufacture of crown, sheet, plate, and bottle glass.* Patent dated March 30, 1853. (No. 762.)

The inventor describes and claims a modification of the furnaces employed in founding glass, in which the sieges now placed at the sides only are continued across the ends of the furnaces. The level of the grate-room is lowered, and the feeding is from the caves.

CHRISTOPHER NICKELS, of York-road, Surrey. *Improvements in weaving narrow fabrics.* Patent dated March 30, 1853. (No. 763.)

Claims.—1. The manufacture of narrow fabrics by employing two carriages working in combs, and acting as shuttles for each narrow fabric, in combination with three warps placed transversely across the machine, whether such two carriages working in combs pass continually on the same sides of the central warp or change sides.

2. The manufacture of narrow fabrics in twist lace machines, by employing a central warp in combination with two weft guides, one on either side of the central warp.

JOHN CARTER RAMSDEN, of Bradford, York, stuff manufacturer. *Improvements in looms for weaving.* Patent dated March 30, 1853. (No. 765.)

This invention relates to an arrangement of mechanism by which that class of fabrics can be woven by power-looms, the patterns or figures of which are produced by changes in the order of succession, in which the leaves of the healds are raised or depressed to form the sheds; or "such as are produced by the hand-loom weaver, by changing the order or succession of treading from one to another." The invention consists in arranging and gearing as many sets of tappets or cams as are necessary to produce the required changes in such manner that any of them can be rendered operative or inoperative at pleasure, or for any fixed time or order, by self-acting mechanism. The cams or tappets are made to

slide upon the shaft which gives motion to them, and a key is fixed to carry them round.

JAMES WORRALL, Jun., of Salford, Lancaster, dyer and finisher. *Certain improvements in the method of preparing, treating, and finishing certain textile fabrics called cords, thicksets, velveteens, and beaverteens.* Patent dated March 30, 1853. (No. 768.)

The principal process claimed by the inventor is that of stiffening the cloth by means of gelatine previously to dyeing; also, dyeing and stiffening the same previous to cutting or raising the pile or nap, and a method of producing what the inventor designates a "leather finish."

LOT FAULKNER, of Cheadle, Chester, machinist. *Certain improvements in the method of obtaining motive power.* Patent dated March 30, 1853. (No. 769.)

Claim.—"Obtaining motive power by means of weighted levers mounted upon a beam, and made to revolve in such a manner that they shall cause each end of the said beam to become alternately the heavier, and thus impart a vibratory or oscillating motion thereto."

ROBERT M'GAVIN, of Glasgow, Lanark, North Britain, merchant. *Improvements in the construction of ships' masts, yards, booms, and in spars.* Patent dated March 31, 1853. (No. 772.)

Claims.—1. The general arrangement and construction of the articles enumerated in the title, as described.

2. The mode of constructing masts and spars with a central malleable-iron core.

3. The use, in the construction of masts and spars, of metal cores or central pieces, the transverse sections of which pieces are cruciform.

4. The mode of constructing masts and spars, wherein metal plates are so disposed as to receive lateral strains "in lines parallel with their planes of width."

GEORGE HANSON, of Huddersfield, York, plumber, and DAVID CHADWICK, of Salford, Lancaster, gentleman. *Improvements in apparatus for measuring gas, water, and other fluids; which improvements are also applicable for obtaining motive power.* Patent dated March 31, 1853. (No. 773.)

This invention consists in the use of a flexible tube or bag, into one end of which gas, water, or other fluid to be measured, enters from the main or other source, and there exerting its force against a roller or rollers placed upon the tube or bag, causes the said roller or rollers to revolve, and discharge from the other end thereof the fluid which has previously entered. Each revolution, therefore, will represent a certain amount of fluid which has passed through the apparatus, and it may be registered in any ordinary way.

Claim.—The employment of a flexible tube or bag capable of being divided into inlet and outlet chambers by a surface travelling thereon, for the purposes set forth.

JOHN RADCLIFFE, of Bradford, Lancaster, manager. *Improvements in looms for weaving.* Patent dated March 31, 1853. (No. 774.)

Claims.—1. "A general arrangement and combination of parts for raising and lowering the shuttle-box, and particularly for that purpose, the use of a travelling chain or other apparatus provided with tappets for bringing a clutch or clutches into gear, so as to cause a cam or cams to operate for raising the shuttle-box; and also with tappets for liberating catches which hold the box in positions to which it has been raised by the said cam or cams."

2. The use of a lever suitably arranged, for enabling the attendant to raise the shuttle-box when required.

GEORGE FERGUSSON WILSON, of Belmont, Vauxhall, Surrey, and JAMES FREEMAN LEE, of the same place. *Improvements in the manufacture of night lights and their cases.* Patent dated April 1, 1853. (No. 775.)

This invention consists in the employment of either a thin casing of metal, or a paper casing with a thin metal lining, and in manufacturing the night-light material of a rather higher melting point than that ordinarily employed!

GEORGE FERGUSSON WILSON, of Belmont, Vauxhall. *Improvements in treating certain oily matters and in the manufacture of oil.* Patent dated April 1, 1853. (No. 776.)

This invention consists in "diminishing or removing the smell and color from oily matters that are produced by the destructive distillation of rosin, and in combining them with the oleic of palm oil and other neutral oils."

PROVISIONAL PROTECTIONS.

Dated July 1, 1853.

1585. John Getty, of Liverpool, Lancaster, merchant. Certain improvements in ship-building.

Dated August 20, 1853.

1948. William Vaughan, of Stockport, Chester, gentleman, and John Scattergood, of Heaton Norris, Lancaster, machinist. Certain improvements in machinery, apparatus, or implements for weaving.

Dated August 23, 1853.

1962. Thomas Herbert, of the firm of Thomas Herbert and Co., of Nottingham, lace-manufacturers, and Edward Whitaker, of Nottingham, mechanic. Improvements in warp-machinery employed in the manufacture of purled and other fabrics.

Dated September 9, 1853.

2071. Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, London, and Rue de l'Echiquier, Paris, France. Certain improvements in lighting for consuming the carbon escap-

ing combustion in ordinary flames. A communication.

2075. Edwin Lumby, of Halifax, York, ironmonger, and Zacchœus Sugden, of Halifax, tinplate worker. Improvements in needles or wires used in the manufacture of carpets, looped piled fabrics, and velvets.

2077. James Martin, of Faversham, Kent, watchmaker. Improvements in locks.

2079. Isaac Lowthian Bell, of the Washington Chemical Works, Newcastle-upon-Tyne. Improvements in the manufacture of sulphuric acid.

2081. Cyprien Marie Tessié du Motay, and Edmond Louis Duflos, of Rue Drouot, Paris, France, chemist and merchant. Improvements in the mode of bleaching fibrous and other substances.

2083. James Childs, of Gilston-road, Brompton, Middlesex, gentleman. Improvements in the manufacture of materials to render them suitable as substitutes for mill-board and such like uses.

2085. Ernest Alexandre Gouin, of Avenue de Clichy, Batignolles, Paris, France. Improvements in looms or weaving-machines, applicable to the weaving of cotton, silk, flax, hemp, wool, or any other fibrous substances, by means of which improvements the warp threads are unwound more regularly from the warp-roller, and the cloth or tissue taken up with more regularity, at the same time without straining the warp-thread; and by means on a peculiar motion in releasing the tension on the warp-thread, he is enabled to give an elastic or back motion to the warp, which permits of all inelastic fibrous substances to be woven upon the power loom; and in case the weft-thread should break, the loom can continue in motion without the cloth-roller continuing to take up, or without detriment to the tissue.

2087. Robert Drew, of the firm of Drew, Nephew, and Co., of Bath, Somerset, stay-manufacturers, and John Bayliss, of Birmingham, Warwick, rifle-implement manufacturer. Improvements in stay and other like fastenings.

Dated September 10, 1853.

2088. William Charlton Forster, of Hatton-garden, Holborn, Middlesex, gentleman. An improved manure.

2089. Arthur Warner, of Dorset-place, Dorset-square, London, Middlesex. The application of the fibrous part of the palm-tree and leaf to arts and manufactures.

2090. John Dickenson Brunton, of Truro, Cornwall, engineer. An improved apparatus for separating gold or silver from their ores or other matters by amalgamation.

2092. John Grist, of Islington, Middlesex, engineer. An improved stave-jointing or shaping machine.

2093. Edwin Scragg, of Buglawton, Cheshire, engineer. Improvements in steam engines.

2094. Edmund Leyland, of St. Helen's, Lancashire, builder. Improvements in apparatus for the manufacture of sulphuric acid.

2096. Charles Jacob, of Ingram-court, Fenchurch-street. Improvements in the manufacture of lime.

2097. Robert Tronson, of the Chamber of Commerce, Liverpool. Improvements in ventilating and preventing spontaneous combustion in ships and other vessels laden with coal, culm, or cinders.

2098. Thomas Metcalfe, of High-street, Camden-town, Middlesex. Improvements in portable chairs and tables.

2099. John Webster, of Ipswich. Improvements in the treatment of fatty and oily matters to render them suitable for the manufacture of candles.

2100. John Ward, of Saville-house, Leicester-square, and Edward Cawley, of Stanley-street, Chelsea. Improvements in chairs, couches, and tables.

2101. Joseph Marks and John Howarth, of the State of Massachusetts, United States of America. Certain new and useful improvements in machinery or apparatus for operating the brakes of a train of railway carriages.

2092. Jules François Chack, of Castle-street, London. Improvements in machinery for cutting veneers. A communication.

Dated September 12, 1853.

2103. William Weild, of Manchester, Lancaster, engineer. Improvements in lathes and in apparatus connected therewith, for cutting, turning, or boring wood, metal, or other substances.

2104. John Wright Child, of Halifax, York, and Robert Wilson, of Low Moor Ironworks, engineers. Improvements in valves and pistons.

2105. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, and of Glasgow, North Britain, gentleman. Improvements in the transmission of motive power, being an improved substitute for the crank. A communication from Jean Lassere, mechanic, and Edmond Heusschen, engineer, of Paris.

2106. Edward Rush Turner, of the firm of E. R. Turner and Co., of St. Peter's Foundry, Ipswich, Suffolk, engineers. Improvements in grinding-mills for farm and other purposes.

2107. John Lilley, junior, of Jamaica-terrace, Limehouse, Middlesex, nautical and mathematical-instrument maker. Improvements in mariners' compasses.

2108. Joseph Maudslay, of Lambeth, Surrey, engineer. Improvements in boilers and furnaces for generating steam.

2109. John Robison, of Coleman-street, London, merchant, and William Jackson, of Leman-street, Middlesex, engineer. Improvements in furnaces for effecting the consumption of smoke.

2110. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. An improved manufacture of printing blocks and cylinders. A communication.

2112. Charles Cannon, of Dance-street, Liverpool, Lancaster, chair-maker. Improved machinery for obtaining motive power.

2113. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. Improved machinery for crushing and grinding mineral and other substances. A communication.

Dated September 13, 1853.

2114. Thomas Henry Ewbank, of South-square, Gray's-inn, Middlesex, gentleman. Improvements in the manufacture of terry or looped fabrics, and in machinery for producing the same.

2115. Charles Frederick Adams, William Gee, Middle-street, Cloth Fair, London, and George Davis, Bath-street, Newgate-street, London. The application of the processes of lithographic and zincographic printing of words, patterns, designs, and marks on metal, glass, wood, and other hard and unyielding substances in sheets, slabs, or flat pieces, with or without the intervention of paper or other flexible material.

2116. Henry Dubs, of Vulcan Foundry, near Warrington, Lancaster, engineer. Improvements in the method of forging or manufacturing iron and steel.

2117. Adolphus Sington, of Manchester, Lancaster, merchant. Certain improvements in machinery or apparatus for grinding or setting doctors, used in calico and other similar printing-machinery. A communication.

2118. Alexander Allan, of Crewe, Chester, engineer. Improvements in locomotive and other boilers for generating steam.

2119. James Hill Dickson, of Evelyn-street, Lower-road, Deptford, Kent, flax-manufacturer and flax-machinist. Improvements in machinery or apparatus for the preparation of flax and similar fibrous material.

2120. Jacob Behrens, of Bradford, York, merchant. Improvements in the manufacture of zinc. A communication.

2121. William Smith, of Little Woolstone, Bucks,

farmer. Improvements in implements for tilling and preparing land for crops.

2122. Emerson Goddard, of New York, United States, America. Improvements in machinery for cutting stone.

2123. Moses Poole, of the Avenue-road, Regent's-park, Middlesex. Improvements in apparatus and means for removing matters or heat from currents of air, gases, or vapours, or from liquids, and for communicating matters or heat to the same. A communication.

2124. Richard Laming, of Millwall, Poplar, Middlesex, chemist. An improved process for purifying gas.

Dated September 14, 1853.

2125. John Wakefield, of Inchicore Works, Dublin, engineer, and James Baskerville, of the same place, engineer. Improvements in and applicable to valves for reciprocating engines driven by steam or other elastic fluid.

2126. John Wilson, of the firm of Messrs. Heald, Wilsons, and Co., of Manchester, calico-printers. Improvements in and applicable to machines for printing fabrics.

2127. Philip Webley, of Birmingham, Warwick, manufacturer. Improvements in repeating pistols and other fire-arms.

2128. John Timmins, of Stafford, surveyor. Improvements in safety-valves for boilers.

2129. Alexander Wallace, of Glasgow, Lanark, North Britain, and George Galloway, of the same place, smiths. Improvements in the construction of portable articles of furniture.

2130. John Jonathan George Collins, of Philadelphia, in the United States of America, engineer. Certain improvements in steam engines.

2131. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, and of Glasgow, North Britain, gentleman. Improvements in sewing-machines. A communication from Mesdames Adrienne Elizabeth Figuier and Euphrasie Chérault, of Paris.

2132. James Higgin, of Manchester, Lancaster, manufacturing chemist. Improvements in burning certain fluids for the purpose of obtaining heat.

2133. Charles Townsend Hook, of Tovil House, Maidstone, Kent. Improvements in the manufacture of pulp.

2134. Richard Dugdale Kay, of Bank-terrace, Accrington. Improvements in block-printing.

2135. Moses Poole, of Avenue-road, Regent's-park, Middlesex. Improvements in machinery for separating flour shorts and dustings from bran as it comes from the bolting-apparatus. A communication.

2136. George Spencer, of Cannon-street West, civil engineer. Improvements in supporting rails of railways.

2137. Jacob Behrens, of Bradford, York, merchant. Improvements in generating steam in steam boilers. A communication.

2138. Thomas Swingler, of Victoria Foundry, Litchchurch, Derby. Improvements in the permanent way of railways.

2139. William Nash, of Burslem, Stafford, whitesmith. An improved mode of manufacturing china and earthenware articles on the lathe.

Dated September 15, 1853.

2140. Charles White, of Pimlico, Middlesex, paper-stainer. Improvements in blocks for block-printing.

2141. Eliezer Edwards, of Birmingham, Warwick, manufacturer. A new or improved gas-stove.

2142. Thomas Browning, of Pendleton, Lancaster, machinist. Improvements in machinery or apparatus for washing, scouring, or cleansing woven fabrics, either with plain or pile surfaces.

2143. Henry Kraut, of Zurich, in Switzerland, engineer. Improvements in tools or implements to be used for boring or cutting rock or other hard substances for the purpose of blasting.

2144. Thomas William Keates, of Chatham-place, Blackfriars, London, chemist. Improvements in the distillation of turpentine and other resinous substances and their products.

2145. Harvey Hilliard, of Glasgow, Lanark, North Britain, of the firm of Hilliard and Chapman, cutlers. Improvements in apparatus for cleaning table cutlery.

2146. Ludwig Frederick Hermann Christoph Knuth, of the Old Bailey, London. Improvements in the manufacture of purses, cigar-cases, reticules, bags, tobacco pouches, and other similar articles.

2147. Henry Jeanneret, of Great Titchfield-street, Middlesex, M.D. Improvements in machinery for digging and tilling land.

2148. Moses Poole, of Avenue-road, Regent's-park, Middlesex. Improvements in distributing printers' type. A communication.

2149. Sydney Smith, of Hyson Green Works, near Nottingham. Improvements in governors for steam engines.

2150. John Barsham, of Kingston-upon-Thames, Surrey. Improvements in the manufacture of bricks, tiles, and blocks.

Dated September 16, 1853.

2151. Francis Higginson, of King William-street, London-bridge, London, Esq. Effecting certain improvements in the means of setting in motion and propelling ships, vessels, and boats of every description, upon seas, rivers, canals, and inland waters.

2152. David Mushet, of Coleford, Gloucester, gentleman. Improvements in steam-engine boiler and other furnaces.

2153. William Shelbourne Icely, of Bromley, Middlesex. Improvements in mechanical telegraphs.

2154. Henry Meyer, of Manchester, engineer. Improvements in looms for weaving.

2155. William Carron, of Birmingham, Warwick, machinist. An improvement or improvements in signalling or communicating intelligence.

2157. Andrew Barclay, of Kilmarnock, Ayr, North Britain, engineer. Improvements in arranging and working mining engines.

2158. Andrew Barclay, of Kilmarnock, Ayr, North Britain, engineer. Improvements in lubricating shafts or revolving metallic surfaces.

2159. Alexander Thomson, of Glasgow, Lanark, North Britain, brick-builder, and David Lockerbie, of the same place, manager. Improvements in kilns for baking and burning articles in earthenware.

2160. John Adcock, of Marlborough-road, Dalston, Middlesex, cigar-manufacturer. An improved apparatus for measuring the distance travelled by vehicles.

2161. Baldwin Fulford Weatherdon, of Chancery-lane, Middlesex, and Matthew Slade Hooper, of Sydenham, Kent. Certain improvements in railway signals.

Dated September 17, 1853.

2162. Thomas Edwards Lilly, of Birmingham, Warwick, coach builder. Improvements in certain kinds of carriages.

2164. Jonathan Burton, of Crawshaw Booth, Lancaster, manager. Improvements in shuttles for weaving, the whole or part of which are applicable to skewers used in winding and reeling-machines.

2165. Richard Litherland, of Liverpool, Lancaster, clock-maker, and Thomas Picton, of Toxteth-park, near Liverpool, wheelwright. An improved mode of manufacturing brushes, and in machinery for applying the same to the purposes of polishing and cleaning.

2166. Christopher Nickels, of York-road, Lambeth, and Ralph Selby, of York-road aforesaid. Improvements in the manufacture of flexible tubes and bands, and in covering wire.

2167. Henry Constantine Jennings, of Great Tower-street, London. Improvements in treating and bleaching resinous substances.

2168. Baron Henry De Bode, of Albert-street, Camden-road. Improvements in the manufacture of wheels.

2169. Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent-agent. Improvements in the manufacture of soap and saponaceous compounds. A communication.

Dated September 19, 1853.

2170. Edward Thomas, of Belfast, Ireland, power loom factory manager. An improvement in the construction of looms for weaving.

2172. William Lanphier Anderson, of Norwood, Surrey, gentleman. Improvements in propelling ships and other vessels.

2174. Thomas Restell, of the Strand, Westminster, chronometer-maker. Improvements in opening and closing ventilating louvres.

Dated September 20, 1853.

2175. Samuel Walker, junior, of Birmingham, Warwick, manufacturer. New or improved machinery for manufacturing thimbles.

2176. Robert Fletcher, of Birmingham, Warwick, gun-maker, and John Smith, of Birmingham, gun-maker. Improvements in fire-arms and discharging the same.

2177. Henry Walker, of Gresham-street, London, manufacturer. Improvements in the modes or means of stopping or retarding vehicles used on railways.

2178. John Louis Beloud, Samuel Camile Beloud, and George Guyatt, all of Greek-street, Soho, Middlesex, cutlers and surgical instrument-makers. Improvements in shears.

2179. Aristide Michel Servan, of Philpot-lane, London. Improvements in distilling fatty and oily matters.

2180. Moses Poole, of Avenue-road, Regent's-park, Middlesex. Improvements in life-preservers. A communication.

2181. Ferdinand Potts, of Birmingham, Warwick, tube-manufacturer. Improvements in the manufacture of taper tubes, and in the apparatus connected therewith.

2182. William Stockil, of Long-lane, Surrey, currier. A new or improved method of blocking leather used in the manufacture of boots.

2183. Stephen Neal, of Manchester, Lancaster, mechanical engineer, William Blanchard Jerrold, of the Inner Temple, gentleman, and Conrad Montgomery, of Cornhill, London, gentleman. Improvements in machinery for the manufacture of casks and barrels. A communication.

2184. Henry Needham, of Wardour-street, Middlesex, gun-maker. Improvements in revolving fire-arms.

2185. Joseph Gibbs, of Abingdon-street, Westminster, civil engineer. Improvements in the treatment of minerals for the purpose of separating impurities therefrom.

Dated September 21, 1853.

2186. George Peabody, of Warnford-court, London, merchant. Improved machinery for dressing and warping yarns. A communication.

2187. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. An improved method of forming seams and ornamental stitching, and in machinery for effecting such operation, part of which machinery is applicable to the forming of other seams and stitches. A communication.

2188. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. An improved mode of constructing steam boilers, applicable also in part to the construction of condensers. A communication.

Dated September 22, 1853.

2192. Peter Rothwell Arrowsmith, of Bolton-le-Moors, Lancaster, and James Newhouse, of the same place, overlooker. Certain improvements in machines for spinning and doubling.

2194. Thomas West Walker, of Hanley, Stafford, potter's manager. Certain improvements in the manufacture of crates made of wood for the use of potters.

2196. Samuel Alexander Benetfink, of Cheapside, London, ironmongers. An improved construction of coal-box.

PATENTS APPLIED FOR WITH COMPLETE SPECIFICATIONS.

2190. James Baldwin, of Birmingham, Warwick, paper-manufacturer. Improvements in the making of paper bags. September 22.

2209. Charles Frederick Stansbury, of Cornhill, London. A new and useful method of converting fine coal into solid lumps. September 26.

2215. Nicholas Callan, of the R. C. College, Maynooth, Kildare, Ireland. A new mode of protecting iron of every kind against the action of the weather, of rain, river, spring, and sea-water, so that iron thus protected may be used for roofing, for cisterns, pipes, gutters, window-frames, telegraphic wires, for marine and various other purposes. September 27.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," September 30th*, 1853.)

1074. George Frederic Goble. Improvements in locks.

(*From the "London Gazette," October 4th*, 1853.)

1002. Auguste and Jean Le Roy, and Eugene Pavy. Improvements in the production of lace and other fabrics.

1037. George Thomas Day. Improvements in travelling packages.

1068. Mark Newton. Certain improvements in the construction of carriages, and in the means of preventing the overturning of the same when horses take fright. A communication.

1110. Thomas Fearnley. Improvements in steam boilers.

1116. John Ryan Danks and Bernard Peard Walker. Improvements in the machinery or apparatus for the manufacture of nails.

1153. George Stevenson Buchanan. Improvements in the treatment or finishing of textile fabrics.

1167. Edmund Whitaker and James Walmsley the younger. Improvements in the manufacture of pipes, tiles, bricks, and slabs from clay.

1172. George Frederick Goble. Improvements in propelling vessels and carriages, parts of the machinery therein employed being also applicable to other like purposes.

1336. George Goodlet. Improvements in engines to be worked by steam, air, or air and water combined.

1377. Henry John Betjemann. Improvements in chairs.

1481. John Piddington. Improvements in obtaining infusions and decoctions, and in vessels or apparatus employed therein. A communication.

1585. John Getty. Certain improvements in ship-building.

1599. Marcus Davis. Improvements in carriages, scaffoldings, and ladders, which scaffoldings and ladders are used as carriages.

1617. William Edward Newton. Improvements in locks and latches. A communication.

1618. Henry Bate. A new fire-escape, which he denominates the "Ingnevador."

1640. Frederick Meyer. Improvements in the manufacture of candles and night-lights.

1712. Peter Armand Lecomte de Fontainemoreau. A new mode of fastening buttons to garments, and an improved button; and also in machinery for manufacturing the same. A communication.

1774. Griffith Jarrett. Improvements in machinery or apparatus for stamping or printing coloured surfaces.

1869. Thomas Kelley Hall. Certain improvements in forge-hammers.

1802. Daniel Hiel Picciotto. Improvements in weaving. A communication.

1925. Thomas Kirkwood. Improvements applicable to ventilation and other purposes.

1968. George Culverhouse. Improvements in manufacturing compost or manure.

2016. Astley Paston Price. Improvements in treating wash-waters containing soap, oils, saponified or saponifiable materials, and in obtaining products therefrom.

2023. Henry Jeremiah Iliffe and James Newman. Improvements in the manufacture of buttons.

2028. John Hinks, George Wells, and Frederick Dowler. New or improved machinery, to be used in the manufacture of metallic pens and penholders.

2070. William Hall. Improvements in the conversion of peat into charcoal.

2075. Edwin Lumby and Zacchœus Sugden. Improvements in needles or wires used in the manufacture of carpets, looped pile fabrics, and velvets.

2079. Isaac Lowthian Bell. Improvements in the manufacture of sulphuric acid.

2081. Cyprien Marie Tessié du Motay and Edmond Louis Duflos. Improvements in the mode of bleaching fibrous and other substances.

2083. James Childs. Improvements in the manufacture of materials, to render them suitable as substitutes for mill-board and such like uses.

2084. Henry Woodhead. Improvements in spinning-machinery.

2085. Ernest Alexandre Gouin. Improvements in looms or weaving-machines, applicable to the weaving of cotton, silk, flax, hemp, wool, or any other fibrous substances, by means of which improvements the warp-threads are unwound more regularly from the warp-roller, and the cloth or tissue taken up with more regularity, at the same time without straining the warp-thread; and, by means of a peculiar motion in releasing the tension on the warp-thread, he is enabled to give an elastic or back motion to the warp, which permits of all inelastic fibrous substances to be woven upon the power-loom; and in case the weft-thread should break, the loom can continue in motion without the cloth-roller continuing to take up, or without detriment to the tissue.

2089. Arthur Warner. The application of the fibrous part of the palm-tree and leaf to arts and manufactures.

2097. Robert Tronson. Improvements in ventilating, and preventing spontaneous combustion in ships and other vessels laden with coal, culm, or cinders.

2098. Thomas Metcalfe. Improvements in portable chairs and tables.

2100. John Ward. Improvements in chairs, couches, and tables.

2101. Joseph Marks and John Howarth. Certain new and useful improvements in machinery or apparatus for operating the brakes of a train of railway carriages.

2107. John Lilley, junior. Improvements in mariners' compasses.

2108. Joseph Maudslay. Improvements in boilers and furnaces for generating steam.

2116. Henry Dubs. Improvements in the method of forging or manufacturing iron and steel.

2117. Adolphus Sington. Certain improvements in machinery or apparatus for grinding or setting doctors used in calico and other similar printing-machinery. A communication.

2120. Jacob Behrens. Improvements in the manufacture of zinc. A communication.

2121. William Smith. Improvements in implements for tilling and preparing land for crops.

2122. Emerson Goddard. Improvements in machinery for cutting stone.

2123. Moses Poole. Improvements in apparatus and means for removing matters or heat from currents of air, gases, or vapours, or from liquids, and for communicating matters or heat to the same. A communication.

2125. John Wakefield and James Baskerville. Improvements in and applicable to valves for reciprocating engines driven by steam or other elastic fluid.

2126. John Wilson. Improvements in and applicable to machines for printing fabrics.

2127. Philip Webley. Improvements in repeating-pistols and other fire-arms.

2132. James Higgin. Improvements in burning certain fluids for the purpose of obtaining heat.

2134. Richard Dugdale Kay. Improvements in block-printing.

2135. Moses Poole. Improvements in machinery for separating flour-shorts and dustings from bran as it comes from the bolting apparatus. A communication.

2136. George Spencer. Improvements in supporting rails of railways.

2137. Jacob Behrens. Improvements in generating steam in steam boilers. A communication.

2138. Thomas Swingler. Improvements in the permanent way of railways.

2147. Henry Jeanneret. Improvements in machinery for digging and tilling land.

2148. Moses Poole. Improvements in distributing printers' type. A communication.

2151. Francis Higginson. Effecting certain improvements in the means of setting in motion and propelling ships, vessels, and boats of every description, upon seas, rivers, canals, and inland waters.

2166. Christopher Nickels. Improvements in the manufacture of flexible tubes and bands, and in covering wire.

2168. Baron Henry De Bode. Improvements in the manufacture of wheels.

2169. Richard Archibald Brooman. Improvements in the manufacture of soap and saponaceous compounds. A communication.

2180. Moses Poole. Improvements in life-preservers. A communication.

2182. William Stockil. A new or improved method of blocking leather used in the manufacture of boots.

2185. Joseph Gibbs. Improvements in the treatment of minerals for the purposes of separating impurities therefrom.

2190. James Baldwin. Improvements in the making of paper bags.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed October 1, 1853.

786. Sir James Caleb Anderson.
798. Robert William Sievier and James Crosby.

Sealed October 3, 1853.

810. William Mavitz.

Sealed October 6, 1853.

825. Henry Leachman.
847. George Humphrey.
854. Stephen Taylor.
864. William Urquhart.
865. William Russell Palmer.
866. William Russell Palmer.
869. Donald Nicoll.
870. Samuel Russell and Robert Murray McTurk.
875. James Taylor, Isaac Brown, and John Brown.
881. Robert John Kaye and John Ormerod Openshaw.
895. Charles Clifford.
902. John Bethell.
924. Jean Marie Souchon.
931. Richard Ford Sturges.
932. Joel Watts.
938. François George Sicardo.
955. Richard Archibald Brooman.
968. James Petrie.
1159. Henry Potter Burt.
1236. Edward Briggs.
1613. Thomas William Kennard.
1748. Warren De la Rue.
1753. John Dawson.
1759. Farnham Maxwell Lyte.
1791. Philipp Schäfer and Frederick Schäfer.
1795. Augustus Russell Pope.
1797. Charles May.
1798. Richard Holme.
1824. Richard Brown Roden.
1827. George Fergusson Wilson and Alexander Isaac Austen.
1838. John Hughes.
1839. John Marten.
1849. Moses Poole.
1858. James Burden.
1873. John Dearman Dunnicliffe and John Woodhouse Bagley.
1908. Alexander Dalgety.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
Oct. 1	3517	James Mellor	Macclesfield	A stock.
,,	3518	James Mellor	Macclesfield	A cravat.
6	3519	F. L. Bauwens	Pimlico	Lamp candlestick.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1575.] SATURDAY, OCTOBER 15, 1858. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

GRIST'S PATENT CASK-MAKING MACHINERY

Fig. 3.

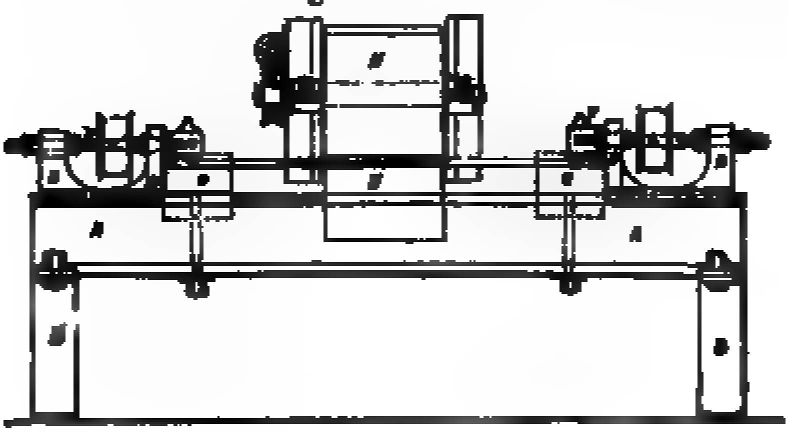


Fig. 4.

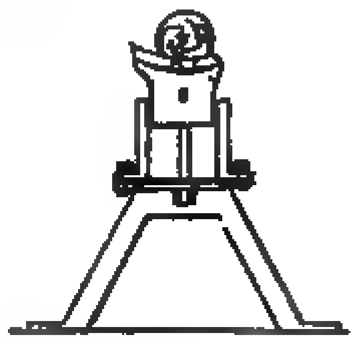


Fig. 6.

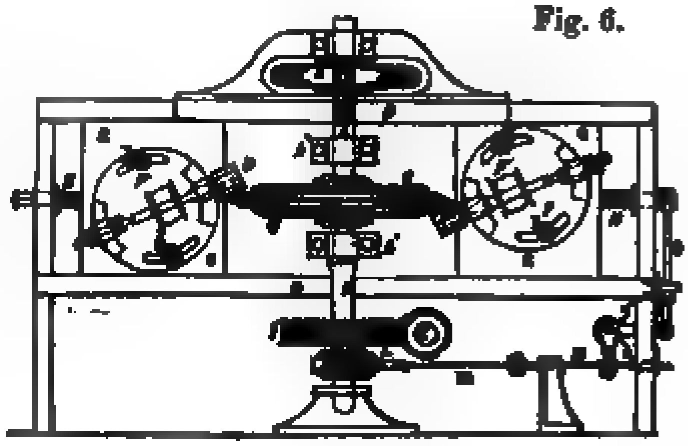


Fig. 1.

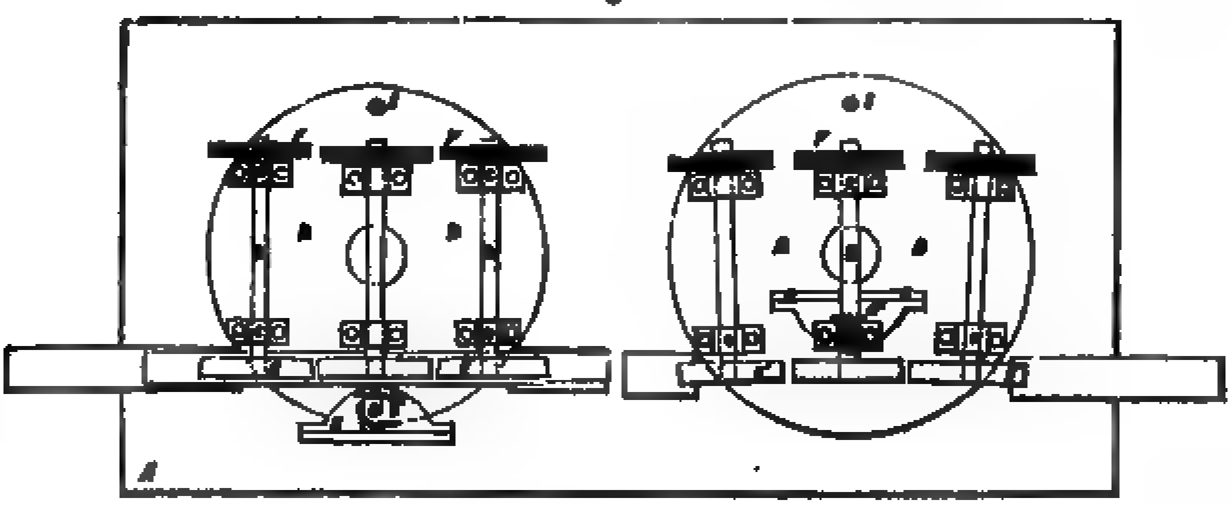
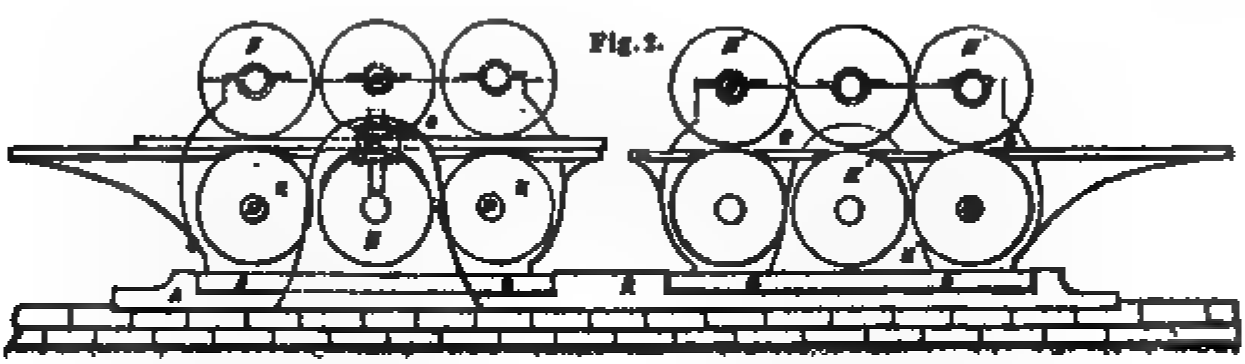


Fig. 2.



GRIST'S PATENT CASK-MAKING MACHINERY.

We take the earliest opportunity of publishing a description of Mr. Grist's elaborate invention, the objects of which were set forth in the claims we lately abstracted from his specification. (See *ante*, No. 1569, page 195.) The invention is, however, of too high a character to be passed over with simply a statement of its objects. Mr. Grist has succeeded in producing a set of most ingenious machines, which will be found no less remarkable for the efficiency of their operation, when practically applied, than they are for the evident skill with which they have been contrived. Indeed, if our estimate of the invention be not too high for its merits, the processes of cooperage, which have so long been comparatively without the aid of mechanical appliances, will now undergo considerable improvement in this respect.

This invention applies to the several operations performed in manufacturing casks, barrels, and other similar vessels. These are—*First. The Jointing of Staves*, for giving to the rough wood or blank the requisite bulge and bevil. The nature of the improvements under this part of the invention consists in so arranging the cutters in a jointing-machine, that the one is in advance of the other, and works on opposite sides of the centre line of the blank, whereby both sides of the staves, when they issue from the machine, have imparted to them the shape necessary for their formation into a cask. The cutters are also so placed in respect to the centre driving-rollers that the centre line of the spindle of the cutters corresponds to the centre line of the shafts carrying such rollers, whereby the wood is held firm while being cut. The rollers are made conical, and the shafts carrying them are mounted in framework upon circular plates, which have a partial rotation imparted to them upon their axes, whereby the blank is caused to travel in the required path. Fig. 1 of the engravings hereunto annexed represents a plan, and fig. 2, a side elevation of the jointing-machine. A A is the base-plate, which has formed in it two circular recesses, in which the circular plates, B B, carrying the framework, C C, partially revolve. D D are shafts, upon which are fitted the conical rollers, E E^1, which are mounted in pairs, and driven by the gearing, F F. G G^1 are the cutters, mounted upon the spindles, G^2 G^2, in the frames, H H, and caused rapidly to rotate by suitable strap-pulleys. I I are stud-pins projecting from the circular plates, B B, to which pins are attached eccentrics (not shown in the engravings) for imparting the necessary partial rotation to the plates. The action of this machine is as follows:—The cutters, G G^1, are arranged on opposite sides of the machine, and the conical rollers, E E^1, are so placed in respect to each other, that as the blank leaves the set of rollers, E, and cutter, G (when one side of the blank will be shaped), the set of conical rollers, E^1, take hold of it and carry it forward to the cutter, G^1, in a similar curved line, but on the opposite side, so that the two sides of the blank, after leaving the cutters and rollers, are shaped to the same curve. The cutters are set at an angle, so as to cut the edges of the blank to a bevil corresponding to the radius of the intended cask.

Second. The Chiming and Creusing of Staves.—The particular feature in this part of the invention consists in chiming and creusing each and every stave separately, and before a number of staves have been put together to form a cask. Fig. 3 represents a front elevation of a machine adapted for performing this part of the invention. Fig. 4 is a transverse section on the line, *a b*, of fig. 3. A A is a bed bolted to the standards, B B. C C are the bed-plates, which are fixed one in each end of the bed, A, the upper surfaces of which are carved to a shape corresponding to the outer circumference of the cask. D D are headstocks, which carry the spindle, E E, of the cutters, F F, which are caused to revolve rapidly by means of driving-belts upon the pulleys, G G. H H are feeding-rollers, turning in suitable bearings. The cutters, F F, are made of the shape shown, so that as the ends of the stave are passed beneath them by the feed-rollers, H, the chime-grooves are cut.

Third. The Trussing of Casks.—The peculiar feature in this part of the invention consists in trussing, by means of apparatus or machinery, inside the cask; so that as the cask is brought to the required shape, it may be further operated upon on the outside without obstruction from the trussing-machinery. Fig. 5 represents a vertical section of a machine for trussing from the inside. A sufficient number of staves for forming a cask are arranged in circular order, the lower end being confined by a truss-hoop, *a a*. The staves so held are then placed on the bed-plate, A, with the tube, B, in the inside. C is a shaft, the lower portion of which has a screw cut upon it. D D are chains, which are attached at one end to the head, D^1, of the shaft, C, and passing over the pulleys, *b b*,

centred in the end of the tube, B, are connected to the hooked plates, E E, which grasp the upper end of the staves. The screwed end of the shaft, C, is passed through the boss of the worm-wheel, F, which is cut with a corresponding thread. G is an endless screw, for driving the worm-wheel, F, which as it revolves draws down the shaft, C, and chains, D D, whereby the staves are brought into the form of the cask, as indicated by the dotted lines. H is a second endless screw, for reversing the motion of the worm-wheel, F, in order to release the cask from the chains.

Fourth. The Hooping or Close Trussing of Casks.—The nature of this part of the invention consists in close trussing or hooping the cask, by means of a series of levers in connection with screws worked by suitable gearing, whereby the hoops are drawn on as tight as required. In order to strengthen the truss-hoops, and prevent them from being injured, he places metal shoes around them.

Fifth. The Shaping of the Heads of Casks.—The peculiar feature of this part of the invention consists in causing the head to revolve between cutters diametrically opposite to each other, and working on the opposite sides of the head. The cutters have also receding and advancing motion imparted to them, so as to cut the head of an elliptical form. Fig. 6 is a front elevation of this machine. A A are two shafts mounted in the plummer-blocks, A^1 A^1, on the framework B B. The centres of these shafts coincide. C C are plates or flanges formed upon the shafts, A A, and between which the wood to form the head is firmly held. D D are the cutters mounted upon the spindles, E E, which turn in the headstocks, F F, carried by the frames, G G, which slide in V, grooves in the upper and lower parts of the framework, B, when acted upon by the right and left-handed screw, H, which is tapped through nuts attached to the back of the moveable frames, G. The cutters work at the angle indicated, so as to bevil the edges of the head as it revolves between them. This angle of inclination can be altered by the set screws, *b b*. I is a worm-wheel on the shaft, A, driven by the endless screw, K, for imparting the required rotary motion to the head. L is an eccentric upon the same shaft as the worm-wheel, connected by the rod, M, to one arm of a bell-crank lever, N, centred at *a*, the other arm of which is jointed to the rod O, connected to a lever, P, which terminates with an eye to fit the end of the screw, H. By this means, as the shaft, A, revolves, the eccentric is also caused to rotate, and through the intervention of the rods and bell-crank lever to turn the screw, H, and so cause the frames, G, and with them the cutters, D, to recede and advance, and give to the head its requisite elliptical form. R is a hand-wheel for releasing the head when finished, and for securing a fresh one in its place. A set screw is placed in the boss of the hand-wheel, to prevent the shaft, A, from unscrewing during its revolution.

Fig. 7.

Sixth. The Boring of Bung-holes in Casks.—The nature of the improved boring-machine consists in the direct application of a drill spindle fitted with a suitable tool for boring the bung-holes in the casks. Fig. 12 is an end view of one of these machines, A is the bung-hole borer carried by the spindle, B, mounted in the plummer-blocks, C C, bolted to the framework, D. The spindle B, is free to move up and down in the plummer-blocks, and is caused to revolve by the strap-pulley, E. The upper part of the spindle is connected by a garter-pin and groove to a counterbalance-lever, F, centred at *a*, and raised and lowered by the handle, G, so as to bring the borer into and out of action.

And Seventh. The Bevelling or Flewing of the Hoops of Casks.—The improvements under

this head of the invention have for their object the forming or bevelling the hoops to render it conical, so that it may fit the cask. This is accomplished by means of tilt-hammers, the faces of which are slightly inclined, so that as they strike the strips of hoop-iron one edge shall be rendered thinner, which serves to elongate that edge, and so to "flew" or form the hoop of a conical shape when made up.

PHOTOGRAPHIC FRAUDS, AND THEIR PREVENTION.

The following letter has been addressed to the *Times*, by M. Claudet, the well-known photographer. We transfer it to our columns, as it contains several facts both of scientific and public importance :

Sir,—Having read in the *Times* on Saturday an article on photographic frauds upon the Bank of England, I am induced to make a few observations on the subject.

Several years ago (about 1845) being struck with the possibility of applying photography to the forgery of bank-notes and other public securities, I made several experiments in order to know how far the various photographic processes were capable of being successfully employed in the imitation of the paper currency, and, in case they could, to find the means of preventing the fraud.

I began by the Talbotype process, by first forming a negative by the direct contact of the bank-note on a photographic paper, and then copying this negative also by contact, producing a positive, which was the closest possible imitation of the bank-note, with this difference only, that the general colour of the letters and writing, instead of being black, were a sort of brown sepia colour, which is the general tint of Talbotype pictures; but this did not seem to me a decided impediment in the success of the forger, for I conceived that by some chemical agents the silver forming the dark parts of the false bank-note could be finally turned into a black, similar to the colour of ink. The most surprising result was the representation of the watermarks, which are worked in the texture of the bank-note paper, and which appeared in the copy as if they were really also existing in the substance of the paper. I showed the result of the experiments to Mr. Marshall, the cashier of the Bank of England, and I believe I gave him one of my impressions. I pointed out to that gentleman the means which I thought would prevent the fraud, should skilful forgers ever succeed in obtaining the black colour of the ink and in imitating the Bank paper. These means consisted in employing inks of various colours, in conjunction with black ink, to form the various devices and letters of the bank-note.

In photography, red, orange, yellow, and green produce black; while blue, indigo, and violet produce white. Now, from these different properties of the various colours it is evident that a bank-note, with its printing, emblems, devices, writing, &c., printed in variegated colours, would offer the greatest difficulties to the perpetration of the fraud; for the lightest colours to the eye would produce the darkest effect in the copy; while the darkest colours—such as blue, indigo, and violet—would be hardly represented at all, or but very slightly. It is, indeed, fortunate that photography, while offering to the forger the temptation to exercise his dangerous skill, at the same time teaches us the means to render his attempts abortive.

Nothing is, in fact, more easy. The Bank of England, and bankers in general, instead of issuing notes in their present dull state of black and white, have only to transform them into the most elegant and ornamental coloured designs, and they will not only frustrate all attempts of the forger, but have the advantage of enlivening the serious appearance of their counters, and spread an artistic taste among the mercantile community. A process similar to lithochromy might be employed in printing the various colours, the coloured bank-note requiring to be printed several times.

It is important to observe that the watermarks which are in the texture of the bank-note paper, although represented apparently with a singular fidelity, are, in reality, the best security against photographic forgeries. This fact may be thus simply explained:—The lines forming the watermark, and the double outlines forming the letters, are thinner than the rest of the paper, and it is owing to that difference of thickness that the designs and letters are made conspicuous; but there is in this effect a remarkable peculiarity. By reflection the thinner parts appear darker than the thicker, while by transmission the reverse is the result. Now, although the Talbotype process will copy by contact in the most perfect manner the effect of transmission, it cannot copy at the same time the contrary effect of reflection, because the illusion of the watermark on the photographic bank-note is not due to a difference of texture in the thickness of the paper, but only to a slight tint imparted to

the surface by the unequal chemical action, the intensity of which is in an inverse ratio to the thickness of the paper. The way to test the note is, therefore, this:—When we hold a genuine bank-note vertically between our eye and the window, or lamp, the water-marks and the letters appear lighter than the ground of the paper, and when we hold it horizontally under our eye, the water-marks and letters appear darker than the ground. It is impossible to imitate this double effect by any photographic means, and the fraud may be easily detected by this very simple test, which requires only to be known to serve the purpose.

The article in the *Times* to which my observations refer, appears to me to be written by a person fully competent in the matter; the principal suggestions are founded upon the true principles of photography, and may be very useful in the measures which the Bank will decide upon, for its own security and that of the public. But there is one which does not seem to me advisable; because, although perfectly applicable to the prevention of fraud by the process explained by the writer of the article—viz., the double process of copying by direct contact first, to obtain a negative; and secondly, the positive, or intended bank-note,—it would not prevent the possibility of obtaining at once a positive impression by means of the camera obscura. I allude to the idea of having the paper yellow and the letters blue. This, instead of being an impediment to the fraud, would facilitate and simplify it considerably; for the forger would only have to copy the bank-note by the camera on a yellow paper, similar to that of the Bank, and which would not be affected by the chymical operation, or on a white paper, coloured afterwards. In this case the model bank-note would be, photographically speaking, the negative, and the copy the positive; for the yellow paper would produce no effect on the sensitive coating, and the blue would produce the usual sepia tint, which might be turned blue by some re-agents.

For this reason I think that the best plan consists in the production of bank-notes on the usual white paper, with a tasteful design in a variety of colours.

The idea of having a few words or some ornamental device struck off upon the back of the genuine note would be of no advantage; for, in case of the note being copied by the camera, everything on its face as well as all seen through its semi-transparent texture, would be accurately copied, and all on the back would be reduced in intensity and clearness—from being seen through the thickness of the note—precisely in the same manner as seen by the eye.

The necessity of employing several engraved plates, for the distribution of the colours, would entail a great expense in the manufacture of the notes, but it would serve the purpose, not only of preventing photographic frauds, but also rendering forgery more difficult by the usual means of engraving.

But, after all, it may be that the danger is only a "false alarm;" the impossibility of giving the double effect of the watermark produced by reflection and transmission might be found a perfectly sufficient security, when the attention of the Bank and the public has been directed to this sure test; and when the fraudulent photographer has found that his forgeries can be detected at the first inspection by the most inexperienced observer.

I send you a positive, made to-day from a negative taken in 1845, but owing to the badness of the light to-day, it is not nearly so perfect as some I have made before.

For the information of the public, I shall lay on the table of the reception-room of my establishment some photographic imitations of bank-notes, where they may be examined by visitors.

I am, Sir, yours, &c.,

A. CLAUDET.

107, Regent-street, Oct. 10.

ECHOL'S WATER-GAUGE FOR STEAM BOILERS.

THE *Scientific American* gives the following description of this instrument, which has been recently brought before the American engineering world as an improvement on the glass tube ordinarily used:

Fig. 1 is a longitudinal vertical section, and fig. 2 is a front view. B is a tube whose interior diameter is about two and a half inches; C is a smaller tube, about three-fourths of an inch in diameter, connecting the upper end of B with the upper part of the boiler, and D is a similar tube connecting B with the lower part of the boiler; G and H are hollow nuts screwing into B opposite each other, the hollow in each forming a round passage through the centre of the nut which is enlarged at the inner end to the depth of one-fourth of an inch, so as to form a seat for a hollow half globe of glass which closes the opening, presenting its convex surface inwardly, and its concave surface outwardly; E and F are stop-cocks which usually stand open in the position represented in the figures. The office common to both of them is to close the tubes C and D, when for any purpose it may become necessary to unscrew and take out either of

the nuts; but F performs another office, which will be presently explained. Attached to a float, running up and down with the surface of the water in B B, is a scale of inches numbered 1, 2, 3, &c. The float is represented in the figures as being at usual water line, bringing the figure 4 on the scale, between the two glasses before described, so that the figure can be distinctly seen by looking through the passage in the nuts, and through those glasses. As the actual quantity of the water in the boiler diminishes, whether it be foaming or not, the column of water in B B descends, and with it the float and the scale attached to it, bringing successively to view the figures 3, 2, and 1, so that when the float descends, so far as to rest on the glasses, exhibiting figure 1 on the scale, and presenting to the eye the surface of the water, the water-line will have reached the lowest point of its range.

On the other hand, when the actual quantity of water in the boiler increases until the surface of the column in B B reaches the highest point of its range, the float and attached scale will rise with it, bringing before the eye and between the glasses, the figures on the scale in numerical order, until the last one, figure 9, appears; so that at any and every moment a figure on the scale can be seen, indicating with infallible certainty the actual quantity of water in the boiler.

F is a three-way cock, placed in its usual position, its third and short passage is closed, and on bringing the handle down one quarter of a circle, the communication with the tube below will be cut off, and one opened outwardly from B B through the small discharge-pipe, K. Now by this operation no water can be discharged besides that quantity which may have been thus cut off above F. By receiving this quantity in a graduated cup (knowing the capacity and diameter of B B), the point at which the water stood in it immediately before the operation, will be known with unerring accuracy, even were the places occupied by nuts and glasses filled up with solid metal, and the float and its scale removed. Were the apparatus to be used in this way, it need not be so long, and the lower end of it should be at a point on a level with that, below which the water in the boiler, when not foaming, should never be permitted to go. But leaving this mode of using the apparatus out of the question, F is a simple and efficient means of blowing out any obstructions in any of the passages above or below it, and of ascertaining at once whether any derangement of any kind, however small, may have taken place. For instance, if upon discharging water as just described, the water did not rise in B B to supply the place of that discharged, and thus carry the float and scale to their former position, it

Fig. 1. Fig. 2.

would be instantly known that an obstruction existed at some point below. This obstruction could be blown out by turning the handle of F back one half a circle, leaving it in a horizontal position, for this operation would cut off the communication between B B and the small pipe K, and open one between the latter and the tube D discharging water alone, and by turning it one quarter of a circle further, leaving it pointing directly downward, a communication from above and below would be opened with the pipe K, and outwardly discharging both

steam and water. It may be mentioned, however, that were either the passage below F, or the one above it, to be materially obstructed, the upward and downward motion and agitation of the float and scale would be so much diminished as to indicate the fact distinctly at once. By placing a reflector behind the nut and glass G, the image of the figure on the scale which may at any time be at that point, may be distinctly seen from any selected position near it.

The advantages claimed for this invention are; first, that it is perfect and certain as the glass tubes now in use would be, if they were not liable to break, nor their transparency to be diminished by continual exposure to heat, because the two small pieces of glass, proposed to be used in connection with the float and scale, answer all the purposes of these tubes, and are not to any extent worthy of consideration liable to break, because each presents an arch to the pressure of the steam, and being always covered with water, are not subjected to so great a heat, nor exposed to so great changes of temperature as are the tubes now in use; and if one should break, or its transparency become too much diminished, a duplicate can be substituted in two minutes of time, by cutting off the communication between B B and the tube C and D, and unscrewing the nut holding the glass to be removed, and setting in the duplicate; the cost of the latter not amounting to ten cents; to all which may be added the convenience and advantage before mentioned, of the three-way cocks, F.

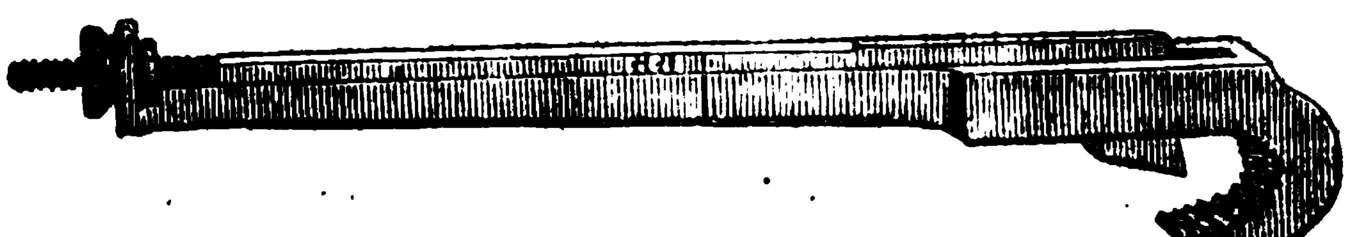
DANIELL'S PATENT STEEL-SHOD STAMP-HEADS.

We are glad to announce the complete success of this very important invention, especially with reference to the Cornish tin, hitherto seriously deteriorated and rendered unfit for various purposes in the arts, from the presence of iron, derived from the abrasion of the cast-iron stamp-heads now in use; and hence the constant and well-founded complaints on the part of the manufacturers having to use that metal, of the bad colour of the Cornish tin. This will be entirely obviated by the introduction of Daniell and Co.'s patent heads; for whilst the principal part of them always remain intact, the steel shoe may be renewed at pleasure; and it has been found by recent trials, for two months, at Tincroft Mine, in Cornwall, upon the hardest stones which that or any other mine in this country produces, that whilst the common cast-iron stamp-heads had lost 2 cwts. in weight and upwards of a foot in length, the wear of the cast-steel shoes was barely appreciable; and now that it has been ascertained that the most highly-tempered steel may be used with impunity, they may be rendered comparatively everlasting for all moderately hard tinstuff or other ores. Cast-iron being of equal density with the oxide of tin, it will be seen that in the experiment referred to, from the wear and tear of the common stamp-head, 2 cwts. of cast-iron per head became inseparably mixed with the tin-ore in two months, and sold as such, to the great detriment of the tin trade and manufacturers in general; for, as in the present case, where the trial referred to was made, 60 heads were constantly at work, the surprising quantity of 6 tons of cast-iron will have been smelted with the ore every two months. The first object of the patentees has been to remedy or prevent the evil, and their patent, and the introduction of cast-steel for blasting purposes, now getting into general use, will fully effect it; but there are other obvious advantages connected with this invention, of vast importance to the miner. The tin ore for the most part is only found as an oxide, and the accidental admixture of iron being prevented, there can be no reason why it should not always fetch the price of fine tin. In point of economy, the steel shoes have an extraordinary advantage over the iron heads now in use—the shoe only, as before observed, requiring renewal, the other part of the head being simply a make-weight; and a receiver, or socket for the shoe, will not be exposed to wear or accident. By the application of the steel shoe, the effective power of the engine will be greatly increased; for besides that the very frequent necessity for the stoppage of the machinery, in order to shift the tongues and introduce new heads, will be almost entirely avoided; it will always present a flat surface to the ore operated upon. We need scarcely remark that the cast-iron head soon becomes rounded and misshapen, so that it is often necessary to throw them out at the end of a month's work; added to which it has been usual, with a view to economise, to continue to work the cast-iron heads till a very considerable part is worn away, to the manifold sacrifice of the power of the engine. This defect will also be obviated by the introduction of the steel shoe.

To the gold mines of Brazil, and other places where the cost of freight and carriage is an object, from the great durability and portability of the shoe, and the fact that it is only that which will ever want renewal, this invention must be of the first importance.—*Mining Journal.*

RICKARDS' PATENT GAS-PIPE TONGS.

Our attention has been directed to this simple but ingenious instrument, which possesses many advantages over the old tongs. One pair will take four sizes, and hold perfectly tight, without any force being used by the hands, which is not the case with the old ones, as when the gripper part becomes worn, and the pipe runs smaller than the usual size for the tongs, the workman requires to use packing. This is not necessary with Rickards' tongs, which can be set to the size required, by moving the nut at the end of the top and movable part, which lifts up to enable the workman to fix it on the pipe (as you would put on the old ones); the groove turned in the brass nut drops in the fork on the bottom part of the tongs, and by the least movement of the nut the grip is sure and perfect. The pipe may then be screwed, without any power being lost, in the same manner as in using a common nut-wrench.



We commend the instrument to practical engineers, who will find it very convenient for the purpose of screwing studs into surfaces, as one of the sizes will take any intermediate size, from three quarters of an inch to an inch and three-eighths, varying only by one thirty-second of an inch, should such nicety be required. It is already in extensive use at gas-works, &c., and has met with considerable approbation.

SIR W. R. HAMILTON'S QUATERNIONS.

To the Editor of the Mechanics' Magazine.

Sir,—I shall be obliged to you if you will insert in your valuable Magazine the following remarks on the article "Sir W. R. Hamilton's Quaternions," published in some recent Numbers. It appears to me that the objections of the article resolve themselves, in a great measure at least, into the objection grounded on a supposed defect in regard to homogeneity, and which is set out as follows:—"The multiplication of two definite lines in space we might reasonably expect to receive the same geometrical interpretation, whatever be the unit of length, in terms of which we think it convenient to represent them. But in this system the product of two such lines varies inversely as the said unit of length! Let us in one case take a yard as the unit of length, then the symbols i, j, k, will denote three lines, of each of which the length is a yard, and their directions of course at right angles to each other. In this we have $ij=k$, that is, the line i a yard long, multiplied by the line j a yard long = the line k a yard long. But how would this be if we took a foot as the unit? Why we should have for the product of the same two lines, which will now be represented by $3i$ and $3j$, the line $9k$, which is three yards long! This seems very ungeometrical." An objection such as this cannot stand for a moment. The symbols made use of in analytical geometry are abstract numbers: in speaking of the line having for its length x, we mean the line whose length is to the unit of length, as x is to 1; or in other words, x is the abstract number representing the ratio of the length of the line in question to the unit of length. So in Sir W. R. Hamilton's system, i is the symbol (analogous to an abstract number, and certainly not containing in itself any concrete unit of length,) representing the ratio of a line considered as having a particular direction in space to the unit of length considered irrespectively of direction in space; or if we place the ratio of the line a yard long considered as having a particular direction in space to the line a yard long considered irrespectively of direction in space. And Sir W. R. Hamilton's equation $ij=k$ is unobjectionable on the ground of homogeneity; I cannot help adding, that I think so inconsiderable an objection ought never to have been made.

The notion of the relation between a Quaternion and a mere line, and the rule for the multiplication of Quaternions, may be illustrated as follows:—A Quaternion referred to a fixed sphere may be considered as made up (I do not of course mean that it is the sum) of a length or positive abstract number, called the modulus, measured off on a radius of the sphere and of a rotation

about this radius.* In the case of the rotation being 0 or a multiple of 2π, the Quaternion is simply an abstract number; viz., the modulus with the sign + or —. In the case of the rotation being an odd multiple of π, the Quaternion is a line; viz., a length equal to the modulus, measured off on the axis. A line given in length and direction, may therefore be considered as a particular case of a Quaternion; viz., it is the Quaternion having for modulus the length of the given line for axis and radius parallel to this line, and for rotation the $\angle \pi$. And the rule for the multiplication of two Quaternions is, that the moduli are to be multiplied together to form the modulus, and the rotations compounded in order to form the rotation of the product Quaternion, the last-mentioned rotation; and therefore the value of the product Quaternion depending of course on the order in which the rotations of the factor Quaternions are compounded, that is on the order of the two factors of the product. And this rule includes the rule for the product of two lines, or, in other words, the *definition* of such product. Stated as above, in a dogmatical form, the definition in question will of course appear a very arbitrary one; but Sir W. R. Hamilton has in his Lectures developed in detail the reasons by which he was led to this notion of the product of two lines, and as involved in it the notion of a Quaternion. That the definition is perfectly consistent with itself any one tolerably familiar with geometry in three dimensions may easily satisfy himself; and of the value of the theory, the beautiful geometrical results which Sir W. R. Hamilton has already obtained furnish the best proof. The suggestion in the article, "that no result has been published which could not be interpreted by force to mean some theorem already known, or that could be readily verified in some independent way," does not profess to be founded upon an examination as to whether any theorem in Quaternions does, in fact, admit of contradictory geometrical interpretations, but is merely made to negative the presumption in favour of the theory arising from its leading to true results; it is an argument *ab extrâ*, which has of course no force with those who have convinced themselves that the theory has a real foundation, and that an interpretation *by force* of any result whatever of the theory is impossible.

I am, Sir, &c.,

A. CAYLEY.

2, Stone-buildings, Oct. 8, 1858.

[We are not surprised at receiving the foregoing letter from our talented correspondent. The novelty, and, we may fairly add, the inherent complication of the new method of science, are quite sufficient to give rise to diversity of opinion upon its structure and its merits. At the same time we do not find in Mr. Cayley's letter the subject of more than a very few observations, especially as the chief ground of his complaint is found in a mere accessory and comparatively unessential paragraph, which, as it occurs towards the close of the article, can hardly be fairly said to be the basis of previous objections, and certainly is not a summary of them. It appears to us that the same objections lie against our correspondent's statements of Sir W. R. Hamilton's principles as against the author's own, and the only question is, whether they are really receivable in the form in which either puts them. But we cannot help objecting to what occurs in Mr. Cayley's criticism of the paragraph he first quotes from us. He says, "in speaking of the line having for its length x, we mean the line whose length is to the unit of length as x is to 1, or, in other words, x is the *abstract number* representing the ratio of the length of the line in question to the unit of length." This is an extraordinary sentence! Let us take the liberty of transposing the terms of it, after a perfectly mathematical fashion. Then, since $x =$ an abstract number, we may commence the sentence thus,—" in speaking of the line having for its length an *abstract number*—"!! This, Mr. Cayley must see, contains a solecism; and it is one which we could not approve of, though every analyst, from Descartes downwards, had chosen to employ it. Indeed, it affords an example of that kind of misapplication of terms on which we stumbled in reading the "Quaternions," and of which we of course complained. But even admitting Mr. Cayley's observa-

* In the notation of Quaternions, if

$$w+ix+jy+kz = \text{M cos. } \tfrac{1}{2}\theta \left\{1+\text{tan. } \tfrac{1}{2}\theta\,(i \cos. \alpha + j \cos. \beta + k \cos. \gamma)\right\}$$

then M is the modulus, cos α, cos β, cos γ the direction cosines of the radius, and θ the rotation.

tions to have all the force which he intended, our main objections, viz., those against the mode by which Sir W. R. Hamilton arrives at the equations $ij=k$ and $ji=-k$, remain untouched.

The concluding remarks of our esteemed correspondent are so self-evident, that we cannot understand why he should have made them. We have, of course, no objection to those who can consent to the author's elementary principles, proceeding through their various developments, and placing confidence in them; but as we cannot thus consent, our remarks upon the subsequent results were, we conceive, quite pertinent.]

RAILWAY SEMAPHORES.

To the Editor of the Mechanics' Magazine.

Sir,—Had my suggestions of half-mile semaphores, noticed in your publication of the 14th of May last (or if more readily-worked swivel-signals) been adopted on our railways, many valuable lives and limbs would have been by this time saved, and the last great and awful accident near Dublin wholly avoided. On referring to the notice you obligingly took of my suggestions, I beg to say, several errors crept into the statement, which can hardly be explained, except by a diagram; but I can state what information could be conveyed by it, to the persons having charge of the train, at whatever rate they were going, viz.:

1st. The driver or guard (it should be a responsible signal-man), upon observing the semaphore at rest, would know that no train had passed that spot within the previous six minutes, and consequently the line was clear.

2ndly. If the semaphore was at the first position, the persons in charge of the train would know a train had passed that spot from three to six minutes previously; and the character of the train—if express, ordinary, or luggage—indicated, and would act cautiously.

3rdly. If the signal was at the second position, it would be understood that a train had passed that spot something short of three minutes before, and cautionary measures might be instantly adopted.

Being confident that this information may be conveyed to the persons in charge of a train, I leave you to judge if accidents, arising from one train running into another, ought to occur.

I am, Sir, yours, &c.,

F. P.

Tyndwfr, Llangollen, Oct. 11, 1853.

The Mining Magazine. Edited and published by W. S. Tenney, 142, Fulton-street, New York. Nos. 1 and 2.

The first Number of the *Mining Magazine* was issued in July of the present year. The following short statement of its intended character, taken from the introductory article, will furnish a sufficient account of the object for which it has been commenced.

"Every subject which can be interesting or useful to those engaged in mining, or in the manufacture of metals, or trading in ores and other minerals, will be embraced from time to time; for it is our intention to render the *Mining Magazine* a standard work on the subjects to which it will be devoted, independent and impartial, so that it may be referred to with certainty and confidence, for counsel and direction on all the topics of which it treats. The state of mining operations, both American and foreign, will be illustrated with neatly-executed cuts; and we are happy to add, that we have secured able and talented co-operation, both at home and abroad."

Judging from the Numbers already before us, we are quite certain that the work itself will not fall short of the high character here set forth. Indeed, we are unusually gratified to find a journal, in every way so superior to many of its contemporaries, proceed from the press of America. We entirely approve of its object, and finding it very admirably conducted, wish it all success. From the second Number we extract the following report of an interesting novelty in mining operations, which has been adopted among the rich hills of Nevada county, in the northern mines:

"A new method of mining in hill-diggings has lately been introduced in this place, as novel as it is efficient. The usual cut is made from the outer edge at the base into the centre of the hill. From a reservoir on its summit (made with a barrel, to preserve a steady pressure) the water is conducted by a leading hose of strong canvas, terminating with a pipe, similar to that of a fire-engine. The column of water thus produced ranges from 20 to 100 feet, according to the height of the hill. The pipe is taken into the area of the cut, and brought to bear upon its sides; and such is the immense power of the water as it escapes from the pipe, that no alluvial deposit can resist the force for an instant. The toughest clay dissolves like wax, thus disintegrating much fine gold, a greater part of which has heretofore been lost. The excellence of the plan and the wonderful celerity with which the work progresses, must be seen to be appreciated. Fancy a

huge boulder, weighing several tons, lying midway in the side of one of those cuts, held there by a deposit of sand, gravel, and clay, hard enough to require a pick in the hands of an ordinary workman, to be sharpened once or twice daily. Then witness the operation of the new appliance: the hydraulic apparatus is brought in contact with the *debris* encircling the boulder, which melts like ice under a midsummer sun, and lo! in much less time than it requires to describe the operation, the huge mass is released from its diluvian home, and comes tumbling down into the space below. The advantages of this important auxiliary to "sluicing" are; 1st. The reduction of manual labour at least two-thirds. 2nd. It opens to miners locations heretofore unremunerative, where they may now realize handsome returns, consequent on the great additional quantity of auriferous soil that may be washed within a given time. And, 3rd. The dangerous process of "undermining," with the fatal results which frequently attend it, may by this new invention be entirely obviated, as the operator can at all times be wholly out of the reach of the overhanging embankments."

SPECIFICATIONS OF PATENTS RECENTLY FILED.

John Smedley, of Lea Mills, Matlock, Derby, spinner. *Improvements in machinery or apparatus for opening, cleaning, blowing, or scutching animal wool, cotton, or other fibrous substances or materials.* Patent dated April 1, 1853. (No. 778.)

This invention relates to the construction of the beaters of blowing machines, and consists in the use of a drum or cylinder, having blades or projecting knives upon the surface of it, so that during its revolutions the knives or blades strike the cotton or material to be opened. The inventor claims the above arrangement.

William Crofts, of Derby-terrace, Nottingham-park. *Improvements in weaving.* Patent dated April 1, 1853. (No. 779.)

Claim.— Certain combinations whereby guides used for carrying and actuating warp-threads are made capable of moving towards, from, and past each other in such manner as to act as shuttle-races, and also admit of weft-threads being introduced by a shuttle when an angular shed is made, and by a shuttle or by guides when the guides carrying the warp-threads are moved away from each other, so as to leave an opening into the shed also, whereby the guides carrying the warp-threads are rendered independent, so as to be actuated by Jacquard or pattern-surfaces, in such manner as at different times to produce different effects by their threads in the weaving of a piece of fabric.

Henry Spencer, manager, Henry Tattersall, mechanic, and Hugh Simphson, carder, all of Rochdale, Lancaster. *Certain improvements in machinery or apparatus for preparing and spinning cotton and other fibrous materials.* Patent dated April 1, 1853. (No. 781.)

This invention relates; first, to carding engines, and consists in placing stationary plates, having serrated edges, in a nearly central position near to, and under the "licker or roller." Secondly, it relates to "throstles," and consists in making the bolster loose upon the bolster rail, and causing it to be worked by the friction resulting from contact with the spindle, whereby the inventors are enabled to run the spindles at unusually high velocities, and also in covering the surface of the said roller with cloth or other substance, which will prevent the spindle-bands from slipping, and thus impart an uncommonly even and uniform twist to the yarn.

The inventors claim the above arrangements.

Robert Evans Peterson, of Tottenham-court-road, Middlesex. *An improved piston.* (A communication.) Patent dated April 1, 1853. (No. 782.)

This invention consists in forming a piston of a flexible or elastic material, of a hollow hemispherical or conical shape, provided with a rim or flange around its outward edge, which flange is, by screw bolts, held fast between the flanges of two hollow metal hemispherical-shaped vessels which form the cylinder, and within the upper of these vessels the flexible piston is enclosed, so as to form a steam-tight chamber between its upper surface and the inner surface of the metal hemisphere. The piston-rod passes through a stuffing-box attached to the top of the upper hemisphere, and is securely fastened to the upper part of the flexible piston.

Claim.—The application of a non-conducting material to the formation of a flexible piston for steam, hydraulic, pneumatic, or other engines.

George Fergusson Wilson, of Belmont, Vauxhall, Surrey. *Improvements in the manufacture of cloths, and in the preparation of wool.* Patent dated April 1, 1853. (No. 783.)

This invention consists in the application of rosin oil to the purposes named in the title.

George Fergusson Wilson, of Belmont, Vauxhall, Surrey. *Improvements in treating certain greasy matters, and in the manufacture of candles.* Patent dated April 1, 1853. (No. 784.)

This invention "consists of exposing strong offensively-smelling greasy matters to a high temperature, with the air excluded, and in causing the bad smell as it comes over to be subject to the action of chlorine or other highly disinfecting agent. And in treating bees-wax with compounds of chlorine and oxygen, preferring to employ, that disengaged from chlorate of potash by treating it with sulphuric acid, and in the application of the above products to the manufacture of candles."

George Fergusson Wilson, of Belmont, Vauxhall, Surrey. *Improvements in the manufacture of night-lights, and in apparatus to be used therewith.* Patent dated April 1, 1853. (No. 785.)

This invention consists in moulding night-lights without cases, of a diameter larger than one inch and three-sixteenths of an inch, and in making incombustible casings to fit them wider than that diameter.

Sir James Caleb Anderson, of Fermay, Ireland, Baronet. *Improvements in locomotive engines.* Patent dated April 1, 1853. (No 786.)

This invention relates:

1. To the construction of certain steam-boilers, which are represented as being easily repaired, and in which a large heating surface and a good draught are said to be secured.

2. To plans by which the steam can be worked at full pressure or expansively, the motions of the piston reversed, and the power conveyed to the wheels of a locomotive carriage by a strap of gutta percha, to be used either singly or with a chain or chains, or wire ropes; and also to an arrangement for guiding a train of carriages on common roads when drawn by a locomotive engine.

George Robb, of Glasgow, Lanark, North Britain, veterinary surgeon. *Improvements in the manufacture of sulphuric acid, alkalis, and other salts.* Patent dated April 2, 1853. (No. 788.)

Claims.—1. "The general arrangement and means for manufacturing sulphuric acid, alkalis, and their salts, as described."

2. The use of powdered pyrites, cinder, oxide of iron, or oxide of manganese formed into masses with clay or alumina, for the purpose described.

3. "The mode of keeping up the heat of the kiln or furnace by the use of heated air, by carbonic oxide, or other cheap combustible gas or heated products of combustion."

4. "The decomposition of common salt in a state of admixture with oxide of iron, pyrites, cinder, or oxide of manganese, by passing the vapour of sulphurous acid through such compound."

5. The mode of operating upon pyrites for the production of sulphuric acid, wherein the heat employed is solely derived from the combustion of the pyrites.

6. The use of bicarbonate of soda as the source of carbonic acid, for effecting the decomposition of sulphuret of sodium, and the mode described of decomposing the sulphuret of sodium.

7. The use of sulphates of lime, and the other agents before mentioned, in the reduction of sulphate of soda to sulphuret of sodium, whereby an easily-workable mixture is obtained.

Christopher Garman Rosenkilde, of Christiansand, Norway, merchant. *Improvements in window-sash fastenings.* Patent dated April 2, 1853. (No. 791.)

The inventor describes and claims a fastening, consisting of a spring, which is fitted into, and fixed at one end in a recess made in the edge of the style-sash, or in the window-frame against which the sash slides. The free end of the spring is furnished with a projecting-piece or knob, and takes into a notch formed in the window-frame, or in the style of the sash, by which the sash is immoveably fixed until the projecting-piece is pressed or lifted out of the notch.

Frederick William Mowbray, of Bradford, York, engineer. *Improvements in doubling wool and other fibrous substances.* Patent dated April 2, 1853. (No. 792.)

This invention consists in supporting each set of bobbins from which yarns are being drawn to form a thread in a frame to which rotary motion is given, in order to put twist on the yarn in its passage to the drawing-rollers, as well as by the flier in its passage from the rollers.

The inventor's claim comprises the above.

William Edward Newton, of Chancery-lane, Middlesex, civil engineer. *Improvements in engines to be worked by air or gases.* (A communication.) Patent dated April 4, 1853. (No. 793.)

This invention relates principally to improvements upon a machine invented by the author of the present improvements, and already patented in this country. In these, as in the original invention, motive power is obtained by the alternate expansion and contraction of a volume of air alternately heated by a stove and cooled by a refrigerator, the air being made to operate first on the underside of the piston in one cylinder, and then by passing through a refrigerator be transferred to the upper side of a piston in another cylinder. According to the present invention, sepa-

rate pistons and cylinders are employed for receiving the hot and cold air.

JAMES FINDLOW, of Manchester, Lancaster, joiner. *Improvements in beds or couches for sick persons.* Patent dated April 4, 1853. (No. 794.)

The inventor describes and claims a method of constructing beds or couches, so that a portion or portions thereof may be moved from beneath the patient, for adapting a convenience, for performing operations, or for other purposes.

WILLIAM EDWARD NEWTON, of Chancery-lane, Middlesex, civil engineer. *Improvements in producing plates or surfaces which may be used as printing or embossing surfaces, or as door-plates, dial or number-plates, or other plates or surfaces bearing inscriptions or devices of various kinds.* (A communication.) Patent dated April 4, 1853. (No. 796.)

Claims.—1. Producing intaglio-graphic printing and other plates from forms of type by surrounding the types whilst in contact with the glass plates, or its equivalent, with plaster of Paris, or some other suitable substance, so that when set the surface of the plaster or other material will be on the same plane with the surface of the types, after which the form of types thus surrounded may be stereotyped in the manner and for the purpose set forth.

2. Producing embossing-plates, by taking a cast in plaster, or its equivalent, from an intaglio-graphic plate, and then stereotyping such plaster cast.

3. Producing illuminated printing-plates for printing shades, intaglio-graphic letters, characters, or figures, by producing an intaglio-graphic plate, as set forth in the first case, from a form of shaded types, and then removing the plaster from the form of types, as described; so that after printing in intaglio with the intaglio-graphic plate, the shadows can be printed either with the form of types after the plaster has been removed, or with a stereotype taken therefrom.

4. Producing poly-chromatic printing-plates from an intaglio-graphic plate by taking a cast therefrom in relief, and from such relief obtaining what the inventor terms a stencil-plate or plates, from which the plate or plates is or are obtained, to have the letters, characters, or figures, in whole or in part, in duplicate of the intaglio-graphic letters or devices, and in relief, so as to register therewith.

WILLIAM BECKETT JOHNSON, of Manchester, Lancaster, manager for Messrs. Ormerod and Son, engineers and iron-founders. *Improvements in steam-engines, and in appratus connected therewith.* Patent dated April 4, 1853. (No. 797.)

Claims.—1. In direct-action compound engines, placing the high-pressure cylinder on one side of the low-pressure cylinder, at such an angle with it that the centre lines of each shall meet or intersect each other at or near the centre of the main crank-shaft.

2. In the same engines, placing a high-pressure cylinder on each side of a low-pressure cylinder, the power of the three being communicated to the same cross bar.

3. In horizontal or diagonal condensing-engines, placing an air-pump on each side of the steam-cylinders, and working the air-pump pistons by the same cross bar as that to which the piston-rod is fixed.

4. In the last-mentioned engines, placing the air-pump in a horizontal position, attached to the under side of the engine framings.

5. In the same engines, working the air-pump piston or bucket by attaching its cross bar directly to the main crank-pin, through the medium of a connecting-rod only, or that of supplementary cranks and shaft worked by the main crank-pin.

6. In the same engines, the application of an adjustable bearing or bearings placed in the gland-box, for the purpose of supporting the piston and rod in their proper central position.

7. In apparatus for regulating the speed of engines, the use of a screw or portion of a screw revolving within an enclosed cylinder containing a fluid, for the purpose of acting upon the steam-valves.

ROBERT WILLIAM SIEVIER, of Upper Holloway, Middlesex, gentleman, and JAMES CROSBY, of Manchester, Lancaster, manufacturer. *Improvements applicable to looms for the manufacture of textile fabrics.* Patent dated April 4, 1853. (No. 798.)

Claims.—1. The application of mechanism to effect a finishing process during the working of the loom, as described.

2. The general arrangements shown for that purpose, and particularly a spiral rib-finisher.

3. The use of an elastic bed for the finisher, and a finisher which is to traverse upon a hard or upon an elastic bed.

4. The use of certain apparatus, as described.

5. The method of raising a pile either by a cutting apparatus and a teazle, or wire card, either used together or separate.

6. A certain method of taking the strain off the warp-threads.

7. Certain means of raising the warp-threads.

JESSE ROSS, of Victoria-terrace, Keighley, York, gentleman, and THOMAS ROBERT HAFFORD ROSS, of New-walk, Leicester, Leicestershire, fancy hosier. *Certain*

improvements in machinery or apparatus for combing wool, cotton, silk, flax, and other suitable fibrous materials. Patent dated April 4, 1853. (No. 799.)

Claims.—1. A general arrangement of machinery, as described.

2. The combing of fibrous materials with card or fine-toothed rollers or cylinders, arranged so as to present clean surfaces as they come up to the circular or other shaped passing comb.

3. The mode of gearing together the lashing, filling, and combing apparatus by means of polygonally-arranged shafts connected together to work in concert.

George Henry Brockbank, of Crawley-street, Oakley-square. *Improvements in horizontal pianofortes,* Patent dated April 4, 1853. (No. 800.)

Claim.—The application of an additional wrest-plank placed above the ordinary wrest-plank, causing the wrest-pins to pass through, and rest within the additional wrest-plank, so that the strings pass between the two wrest-planks.

William Walker, of Park Malt-kilns, Marlborough-street, Leeds, York. *Improvements in drying malt.* Patent dated April 4, 1853. (No. 801.)

This invention consists in constructing an oven under the kiln, within which is a fireplace suitable to burn coal to heat the oven. Between the fire and the roof of the oven metal or other flues or tubes are placed to be heated, and through these air is passed from the atmosphere to the drying-kiln. When wanted to dry with as little fire as possible, and pure air is not required, the fire-doors are left open and the dampers closed, which lets the air from the oven pass to the drying-kiln. Air is also passed over the oven to the kiln. Cold air-passages are also employed for reducing and regulating the temperature.

Charles May, of Great George-street, Westminster, civil engineer. *Improvements in machinery for manufacturing and rolling iron.* Patent dated April 4, 1853. (No. 804.)

Claims.—1. The application of four steam cylinders acting upon a large main wheel, as described.

2. An arrangement by which the rollers are driven alternately in opposite directions, and that without reversing the machinery; the pile or rail may be passed backward and forward through the rolls, and be elongated in both directions, without the necessity of lifting it over the roll.

3. The arranging of a series of pairs of rollers, placed at such a distance apart that the iron may not be between two pairs of rollers at the same time, and yet so that the succeeding pairs of rolls may be so near as to receive the iron immediately it has quitted the preceding pair.

4. A certain mode of constructing and coupling the rolls.

Antoine Burq, of Paris, chemist. *Certain instruments, apparatus, and articles for the application of electro-galvanic and magnetic action for medical purposes.* Patent dated April 4, 1853. (No. 806.)

This invention consists in the manufacture and use of articles formed of combinations of copper and brass, and of English and German steel, to be worn by persons who require to be subjected to magneto-electric action. The articles enumerated are finger-rings, medals, series of medals, bracelets, children's necklaces, and corsets. Also an instrument for striking the surface of the body to increase muscular activity; an Indian Strygil for rubbing the surface of the body; a metallic wadding to be worn next the skin; an armature or ring for fitting the thigh, leg, or arm; and a bath formed of the four metals above enumerated.

The inventor's claim comprises the foregoing.

William Willcocks Sleigh, of London, Middlesex, physician and surgeon. *The production of motive power which he entitles "the counteracting reaction motive power engine."* Patent dated April 5, 1853. (No. 809.)

This invention consists in producing motive power by means of water or other fluid being forced into certain chambers fixed to an axle, the said chambers being so constructed that the portion of the pressure which acts in the direction opposite to that in which it is intended to produce motion is neutralised in such a way that it should not also neutralise that portion of the said pressure which acts in the direction of the intended motion.

William Mavity, of Birmingham, Warwick, electro-plater. *A new or improved method of manufacturing letters and figures to be used as printing type, lettering for sign and window-boards, and other such like purposes.* Patent dated April 5, 1853. (No. 810.)

This invention consists in making letters, figures, &c., in several parts, and afterwards combining the same together. The inventor claims the method.

George Purcell, of Cork, printer. *A new method of adjustment in the art of printing by means of certain combinations of various-sized spaces and quadrats.* Patent dated April 5, 1853. (No. 812.)

According to this new method of adjustment the patentee has his spaces and quadrats of the different bodies of type graduated to pica; as for example, an em quadrat of pica of any body being taken as a standard,

a number of multiples and sub-multiples of this breadth are to be constructed of thicknesses suitable to the following printing types of any body—namely, double pica, great primer, English, small pica, long primer, bourgeois, brevier, minion, emerald, ruby, pearl, and likewise multiples and sub-multiples suitable to the half-bodies of such respective types.

The patentee claims "to make and use adjustments, that is to say, spaces and quadrats, to the body and half-body of the above-mentioned types, which, while ranging in depth and one-half the depth to each particular fount of type, shall bear graduated proportions to a fixed standard of dimensions."

William Pidding, of the Strand, gentleman. *Improvements in the manufacture of woven, textile, or other fabrics, and in the machinery connected therewith.* Patent dated April 5, 1853. (No. 817.)

The patentee takes silk or other material of close texture, including paper, saturates it with gelatine or gum, stretches it in a frame, and passes through it points of wire or needles arranged and fixed in an instrument, in accordance with any design previously made on the fabric. He then inserts studs or other forms of materials, as described in the specification of a former patent, No. 598 (see *Mech. Mag.*, vol. lix., p. 235), into the holes so punctured, which are made to retain their form by allowing the fabric to dry before withdrawing the needles or points. Or instead of studs, he inserts threads or spun glass, gummed and allowed to dry, and then cut into short lengths. When paper, wood, or millboard is the groundwork it may be rendered waterproof, and the fabrics prepared with gelatine may have the gelatine rendered insoluble, or "turned into leather" by tannin, before or after inserting the studs in the perforations. After the studs are inserted, the gelatine or gum is washed out of the fabrics with hot or cold water. Some of these fabrics may be affixed to articles of furniture by adhesive composition; and in some cases the surface may be ground after being affixed, and then covered with a hard varnish which may be polished in the ordinary manner.

William Johnson, of Lincoln's-inn Fields, civil engineer. *Improvements in weaving, and in the machinery employed therein.* (A communication.) Patent dated April 5, 1853. (No. 818.)

This invention relates to an arrangement of annular or circular looms for the manufacture of woven goods in the bag form, the material being woven all round the loom without any selvage.

Claims.—1. The general arrangements of machinery.

2. The application and use of weft-suppliers in weaving mechanism instead of shuttles.

3. The system or mode of weaving circular fabrics direct from the reels, without the intermediate process of warping.

4. The system or mode of weaving piece goods in indefinite lengths.

John Thomas, of Caen, France, gas-engineer. *Improvements in apparatus for the manufacture of gas and coke.* Patent dated April 5, 1853. (No. 820.)

Claims.—1. The setting of retorts employed in the manufacture of gas and coke in a perpendicular or nearly perpendicular position, with mouth-pieces or doors at the tops and bottoms of them, and the furnace of fire employed for heating them so situated that the retorts form the two sides of the furnace.

2. The employment in retorts for the manufacture of gas and coke of a perforated diaphragm, or a perforated pipe for the purpose described.

3. The arrangement of retorts employed in the manufacture of gas and coke in such manner that every alternate bench of such retorts shall be heated by the spare heat from the next adjoining benches of retorts on each side.

William Pidding, of the Strand, gentleman. *Improvements in the preparation or treatment of twine or other threads, or cuttings of paper, or other waste, for the production of useful and ornamental articles.* Patent dated April 5, 1853. (No. 821.)

The patentee uses for knitting crochet and other similar works threads prepared by extending and compressing, or extending only a thread of India rubber, and making therein equidistant holes in which are inserted other threads prepared by taking threads, twine, cuttings of paper, or skins, and dipping these into a solution of gum or gelatine, and then running them through chambers containing flock, floss, and ground or spun glass, or other suitable materials, which are made to float in the chambers, so as to adhere to the threads, &c., when passed through them. Or he uses such threads for weaving, especially in the making of open fabrics, such as net, gauze, &c. The whole of the filaments, fabrics, or others mentioned in the foregoing description, may be electro-plated; when such articles are, or can be, rendered capable of receiving such process. Or the patentee puts threads into a solution of gold, silver, or other metal, then passes them through a chamber containing hydrogen or other gas, thus producing a brilliant appearance in the threads; this will also form a ground or medium for electro-plating.

Claim.—The preparation of thread, twine,

narrow cuttings of paper, or skins prepared by dipping them into a solution of gum, gelatine, or other substances possessing similar properties, covering them when so prepared with flock or other materials as described; and the use of such threads, twine, and other herein-named articles, when so prepared, for the production of ornamental articles.

Edward Simons, of Birmingham, tallow chandler. *Improvements in telegraphing, or communicating signals.* Patent dated April 6, 1853. (No. 822.)

Claims.—1. Communicating signals from one end of a railway train to another by means of a rotatory motion given to a rod or axis extending from one end of the train to the other, the said rod or axis being so constructed as to be capable of flexure, elongation, and contraction, without the said flexure, elongation, or contraction interfering with its power of transmitting rotatory motion. Also an arrangement of signals, whether used in connection with the said rod, or axis, or otherwise.

2. A method or methods of signalling or communicating intelligence from one end of a tunnel to another.

James Jerram Pratt, of Long Eaton, Derby, gentleman. *Improvements in the manufacture of stockings.* Patent dated April 6, 1853. (No. 825.)

These improvements comprehend:

1. A mode of manufacturing the feet of stockings and socks without seams on the sides thereof; and,

2. A mode of engrafting the heels of stockings or socks to the feet and legs thereof, and of using stronger material at such part during such operation, to increase the durability of the articles produced.

Henry Leachman, of Compton-terrace, Islington, colonial broker. *Improvements in the manufacture of iron.* Patent dated April 6, 1853. (No. 825.)

This invention consists in the addition of common brick-dust, salt and black oxide of manganese to pig-iron in the boiling process. The proportions in which these materials are mixed are brick-dust, 120 lbs.; salt, 600 lbs.; and oxide of manganese, 280 lbs.; and the quantity added to the iron varies with its quality from 4 lbs. to 10 lbs. to the heat of 430 lbs. less being used as the iron is superior.

Claim.—The treating of iron by or with a compound of materials, as described.

Henry Alfred Jowett, of Sawley, Derby, engineer. *Improvements in apparatus for heating, which improvements are particularly applicable for generating steam or evaporating solutions, and may be applied for heating purposes generally.* Patent dated April 6, 1853. (No. 826.)

The peculiar features of novelty claimed in this invention is, the use or employment for heating purposes, as above described, of jets of inflammable gas in combination with jets of atmospheric air or steam, which, being applied to the flame while the gas is burning, materially assists the combustion thereof and the generation of heat.

William Radford, of Buckingham-street, Middlesex, Lieut. R.N. *Improvements in the construction of metallic beams or bracings, and metallic sheets or plates applicable to the building of ships and other structures where lightness and strength are required.* Patent dated April 6, 1853. (No. 827.)

Claims.—1. The employment for the construction of ships or vessels of iron, bars of certain sections shown; also, forming the ribs of ships, or vessels, or beams for such or other purposes, of two or more separate bars united together.

2. A method or methods of adapting, connecting, and fitting together the sheets or plates of iron to form the sides of the ship or vessel, whereby the advantages of the butt and lap-joint are combined.

William Johnson, of Lincoln's-inn Fields, civil engineer. *Improvements in the production of ornamental surfaces in glass, porcelain, metals, and similar materials.* (A communication.) Patent dated April 6, 1853. (No. 828.)

The improvements described under this patent embrace two general heads. These are,

1. A system or mode of producing ornamental surfaces by pressing one coloured material into another, and afterwards removing the superfluous portions by grinding or otherwise.

2. A system or mode of ornamenting surfaces by inlaying one within the other, and afterwards uniting the same by heat.

William Augustus Pascal Aymard, of North-street, Finsbury, gentleman. *Certain improvements in the preparation for and application to the manufacture of candles and other surfaces of certain fatty and resinous bodies or substances.* (A communication.) Patent dated April 9, 1853. (No. 832.)

Claims.—1. The solidification of fatty and oily matters by the simultaneous production and application of the vapours disengaged; firstly, from nitric acid; secondly, from the rectification of nitric acid, or the manufacture of nitrates of commerce; and thirdly, from the manufacture of oxalic acid by the application of the deutoxide of azote obtained during the production of oxalic acid, and from the works as described.

2. The application of resinous substances of napthaline and paraffine to the manufacture of candles and other lighting purposes, as described.

William Morgan, of Birmingham, Warwick, manufacturer of piano key-pins,

&c. *Improvements in paper and cardboard-cutting machines.* Patent dated April 7, 1853. (No. 833.)

Claims.—1. The employment in cutting-machines of a rotating cutter or cutters in combination with arrangements whereby the paper-holder is caused to traverse backwards and forwards, so as to bring the paper or cardboard in contact with the rotating cutter or cutters, or the rotating cutter or cutters in contact with the paper or cardboard, when the holder containing the same is stationary, as described.

2 Certain arrangements whereby the knife is caused to receive a radial motion whilst in the act of cutting, and means whereby the knife is actuated whilst cutting, and returned to its place after the cut; also, the use of a fixed iron or steel edge for the knife to cut past, all as described.

3. The employment in cutting-machines of a weighted knife, raised and allowed to fall upon the paper or cardboard to be cut, or of a weight similarly raised, and allowed to fall upon the knife when in contact with the paper or cardboard, as described.

John Grist, of New North-road, Islington, Middlesex, engineer. *Improvements in machinery for the manufacture of casks, barrels, and other similar vessels.* Patent dated April 7, 1853. (No. 834.)

Claims.—1. The cutting and shaping of doublet and tonguer staves by means of guides placed in the front and at the back of the saw-frame, for the purpose of guiding the wood, as described.

2. A certain machine for "listing" staves, as described.

3. A machine for pointing staves, in so far as regards the employment of eccentric rollers, and the placing of the cutters.

4. Certain machinery for trussing casks, as described.

5. Certain machinery for chining and creusing the ends of casks, as described.

6. Certain machinery described for planing the heads of casks.

7. A machine for bevelling the heads of casks, as described.

Frederick William Mowbray, of Bradford, engineer. *Improvements in apparatus used in preparing and combing wool, and other fibrous materials.* Patent dated April 7, 1853. (No. 835.)

Claims.—1. The application of teeth or brush surfaces for the purposes of pressing the wool or other fibre into the carrying or transferring-comb, so that such wool or other fibre may be in a better position to be laid on to the passing comb.

2. The forming the nipping surfaces of nipping instruments used to take wool or other fibrous materials from the feeding-apparatus to be fed or to comb teeth, with two or more rows of ribs and corresponding grooves on the opposite nipping surfaces.

Edward Langdon Bryan, of Hoxton, Middlesex. *Improvements in warming and ventilating rooms and buildings.* Patent dated April 7, 1853. (No. 837.)

This invention consists in forming the lower part of a chimney into an air-chamber by the addition of an iron plate separating it from the upper part, and having a smoke-pipe passing through it, and connected with the fire-grate; the chamber to be connected by an air-shaft with the outer air, and with the apartment by means of a long aperture between the top edge of the front of the grate and the back of the chimney-piece.

Colin Mather, of Salford iron-works, Salford. *Improvements in power-looms.* Patent dated April 7, 1853. (No. 838.)

These improvements consist in procuring a considerable length of yarn between the warp-beam and the breast-beam by means of additional rollers or rails more than the one now used in ordinary looms, for the purpose of obtaining a greater extent of elasticity, and the causing the threads of the warp to be of equal tension in the sheds, and admitting of the opening of the warp into sheds with greater advantage than heretofore.

Robert Pattison Clark, of Lambton colliery, Durham, engineer. *Improvements in machinery for loading and unloading colliers and other ships and vessels.* Patent dated April 7, 1853. (No. 839.)

This invention consists of an arrangement for working cranes on board colliers or other ships. The arrangement is specially adapted to steam vessels, but can be applied in sailing vessels by having a steam-engine expressly to work the crane.

Frederich Le Mesurier, of Pau, Basses Pyrenees, France. *Improvements in apparatus for measuring and indicating a given period of time.* Patent dated April 7, 1853. (No. 840.)

This invention consists in combining the use of two tubes on an axis, the one being inclined and having a bulb at each end to contain sand, and the other containing a ball, the parts being so balanced that the ball retains the apparatus from movement till the sand has been run into the lower bulb, when the extra weight at that end of the apparatus causes the tube containing the ball to incline, when the ball itself will move to the opposite end of the tube, and reverse the position of the apparatus.

Leopold Joseph Green, of Leatherhead, Surrey, ironmonger and whitesmith. *Improvements in axletree-boxes.* Patent dated April 7, 1853. (No. 841.)

This invention consists in using a ring or

hollow screw fixed into the inner end of an axletree-box, and by a fixed collar or projection on the axletree retains it in its box. The screw-ring is fixed or locked by means of a bolt or catch on a bent spring, which partly embraces the axletree-box; the bolt passing through a hole in the box, enters a recess in the screw-rings. The outer end of the box is covered with a screw-cap, which is hollow, and part of the hollow is covered by a plate, by which oil can be placed in the cap before it is applied to the box, which is cast with a hollow longitudinal projection, with an opening into the interior of the box, by which oil may be supplied.

CHRISTOPHER NICKELS, of York-road, Lambeth, Surrey. *Improvements in machinery for masticating, kneading, or grinding India-rubber, gutta percha, and other matters.* Patent dated April 7, 1853. (No. 842.)

Claim.—"The combination of apparatus herein described, whereby two rollers with screws (screw-worms) on their surfaces work together for masticating, kneading, or grinding India-rubber, gutta percha, and other matters."

GEORGE FREDERICK GOBLE, of Great Fish-street Hill, London, master mariner. *Improvements in safety-valves for steam-boilers and gas-chambers.* Patent dated April 8, 1853. (No. 844.)

This invention consists in connecting a valve opening into the boiler to one end of a lever, and another opening outwards to the opposite ends, and suitably balancing them. The lever is supported on a fulcrum within the boiler.

PROVISIONAL PROTECTIONS.

Dated August 10, 1853.

1864. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. An improved preparation or composition to be applied to pigments, for the purpose of facilitating the drying of the same. A communication.

Dated September 10, 1853.

2091. Stopford Thomas Jones, of Trigon-terrace, Clapham-road. Improvements in propelling floating vessels, and in the mode of applying the propellers.

2095. Thomas Gilbert, of Limehouse, sail-maker. Improvements in sewing sails and other articles.

Dated September 22, 1853.

2189. Thomas Smedley, of Holywell, Flint, gentleman. An improved railway-train signal, communicating between the guard and engine-driver.

2191. Frederick Grace Calvert, of Manchester, analytical chemist. Certain improved processes for separating emery from other matters.

2193. Edward Oldfield, of the firm of Messrs. Oddy, Robinson, and Co., of Salford, Lancaster, machine-makers. Certain improvements in machinery for spinning and doubling.

2195. George White, of Laurence Pountney-lane, London, agent. An improvement in paddle-wheels.

Dated September 23, 1853.

2197. James Leetch, of Birmingham, Warwick, gun-maker. An improved method of constructing breech-loading fire-arms.

2198. Charles Alexander, of Albany-road, Camberwell, Surrey. A certain manner of preparing marquetry and all other kinds of inlaid work, in veneers of various thicknesses, and for fixing the same to walls and ceilings of whatever kind, and in or upon floors of wood, stone or metal, and for rendering such floors water and fireproof.

2199. Auguste Edouärd Loradoux Bellford, of Castle-street, Holborn, City, London. The application of the extract of the pine and other trees of the fir tribe to dyeing and colouring purposes. A communication from Nicolas Philibert Guinon, of Lyons, France.

2200. Robert Varvill, of High-ouse-gate, York, wholesale ironmonger. An improved mortising-machine.

2201. William Dantec, of New Quay, Liverpool. Improvements in purifying water.

Dated September 24, 1853.

2202. James Grafton Jones, of Islington, Middlesex, engineer. Certain improvements in the means of conveying signals or intelligence from one part of a railway train to another.

2202. Hiram Tucker, of Massachusetts, United States of America. A new and useful improvement in the art or process of applying colours to a surface by means of a liquid.

2204. Alexander Dalgety, of Florence-road, Deptford, Kent. Improvements in lathes.

2205. William Farmer, of Fulham Brewery, High-street, Fulham. Improvements in apparatus for preserving provisions.

2206. Charles Edward Austin, of Rookwoods, Stroud, Gloucester, civil engineer. An improved reaping, gathering, and binding-machine.

2207. Charles Maitland, of Alloa, Clackmannan, North Britain, brewer, and William Gorrie, of Rosemains, Cranston, Midlothian, North Britain, factor. Improvements in apparatus for heating water or other liquids.

Dated September 26, 1853.

2208. James Smith, of Law Hill, Perth, Scotland, veterinary surgeon. Improvements in scythes.

2210. Joseph Ellisdon, of London, designer and cabinet-maker. Improvements in chairs, whereby they are rendered more portable, and can be converted into other useful articles of household furniture.

2211. Henry Winter, of Castle-street, Holborn, London. An improvement in trousers, to supersede the use of braces, which improvement is applicable to other articles of apparel.

2212. William Adolphus Biddell, of Great Sutton-street, Middlesex, brassfounder. Improvements in alarums and signals to be used in or on railways, ships, houses, buildings, plantations, or other places, for the purpose of giving audible or visible signal in cases of danger or alarm.

Dated September 27, 1853.

2214. Robert Popple, of Beverley, York, colour-manufacturer. Improvements in machinery for slubbing, roving, and spinning cotton and other fibrous substances.

2216. William Prior Sharp, of Manchester, engineer, John Hill the younger, of the same place, manager, and William Martin, of the same place, manager. Improvements in machinery for spinning and doubling cotton and other fibrous substances.

2217. Isaac Bury, of Lower Mosley-street, Manchester, Lancaster, embosser and finisher, and William Green, of Islington, Middlesex, engineer.

Improvements in treating, stretching, or finishing textile fabrics, and in machinery or apparatus for effecting the same.

2218. Robert Brisco, of Low Mill House, St. Bees, Cumberland, Esq., and Peter Swires Horsman, of St. John's, Beckermet, in the same county, gentleman. Certain improvements in the preparation of flax, and other vegetable fibrous substances.

Dated September 28, 1853.

2220. Louis Dominique Girard, civil engineer, of Paris. Certain improvements in hydraulic engines.

2222. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, and of Glasgow, North Britain, gentleman. Improvements in machinery or apparatus for cutting paper. A communication from M. Poirier, of Paris, France, mechanical engineer.

2224. Joseph Fermont Van Waesberghe, of Lockeren, Belgium. The improved manufacture of artificial vinegar.

2226. Thomas Askie, of Little Britain, London, pattern-maker. Improvements in the construction of churns, which improvements are also applicable to other agitating or stirring apparatus.

2228. Michel Ovide Bernard Lesage, of Paris, France. Certain improvements in hydraulic engines.

Dated September 30, 1853.

2238. John Plant, of Beswick, Lancaster, manufacturer. Improvements in the manufacture of textile fabrics.

2240. John Taylor, of Princes-square, Middlesex, engineer. An improvement in the treatment or preparation of skins. A communication.

PATENTS APPLIED FOR WITH COMPLETE SPECIFICATIONS.

2230. Henry Jeremiah Iliffe and James Newman, of Birmingham, Warwick, manufacturers, and Henry Jenkins, of the same place, die-sinker. Improvements in the manufacture of buttons. September 29.

2241. Caleb Bloomer, of Gold's-hill, West Bromwich, Stafford, manufacturer. Improvements in the manufacture of anchors. October 1.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," October 7th*, 1853.)

1071. Thomas Claridge. New or improved machinery for cutting or shearing metals.

1088. Jean Brando Giannetti. Applying the ascensional force of balloons to various useful purposes.

1120. Peter Armand Lecomte de Fontainemoreau. Certain improvements in the manufacture of hat-plush. A communication.

1126. Christopher Richard Norris Palmer. A new and improved mode of communicating or signalling between the guards and engine-drivers on a railway train, also applicable to other purposes.

(*From the "London Gazette," October* 11*th*, 1853.)

1055. John Smith. An improved flooring-cramp and lifting-jack.

1057. Henry Constantine Jennings. Improvements in the manufacture of soap.

1063. Daniel Reading. Improvements in bearings for axles, and in axle-boxes and bushes.

1129. Hesketh Hughes and William Thomas Denham. Improvements in machinery for weaving.

1143. John Clapham, Thomas Clapham, and William Clapham. Improvements in moulding and casting iron pipes.

1209. Robert Boyd. Improvements in weaving.

1222. John Haskett. Improvements in anchors, to be called the "Ferdinand Martin Safety Anchor." A communication.

1243. John Thornborrow Manifold, Charles Spencer Lowndes, and John Jordan. Improvements in the method of extracting the juice from the sugar-cane.

1263. Samuel Alfred Carpenter. A new or improved elastic webbing or fabric.

1289. Thomas Singleton. Improvements in looms.

1327. John Macdonald. Improvements in and applicable to lamps, also applicable to apparatus for light-house signal purposes, part of the invention applicable for other useful purposes.

1329. Julian Bernard. Improvements in obtaining differential mechanical movements.

1378. Edward Blackett Beaumont. Certain improvements in bricks or tiles.

1541. John Henry Johnson. Improvements in the production or manufacture of flour. A communication.

1864. William Edward Newton. An improved preparation or composition to be applied to pigments, for the purpose of facilitating the drying of the same. A communication.

1962. Thomas Herbert and Edward Whitaker. Improvements in warp-machinery employed in the manufacture of purled and other fabrics.

2064. James Gascoigne Lynde, junior. A pressure-governor, or self-acting apparatus for regulating the flow of water.

2087. Robert Drew and John Baylis. Improvements in stay and other like fastenings.

2092. John Grist. An improved stave-jointing or shaping-machine.

2110. Alfred Vincent Newton. An improved manufacture of printing-blocks and cylinders. A communication.

2112. Charles Cannon. Improved machinery for obtaining motive power.

2113. Alfred Vincent Newton Improved machinery for crushing and grinding mineral and other substances. A communication.

2114. Thomas Henry Ewbank. Improvements in the manufacture of terry or looped fabrics, and in machinery for producing the same.

2124. Richard Laming. An improved process for purifying gas.

2133. Charles Townsend Hook. Improvements in the manufacture of pulp.

2144. Thomas William Keates. Improvements in the distillation of turpentine and other resinous substances and their products.

2149. Sydney Smith. Improvements in governors for steam engines.

2150. John Barsham. Improvements in the manufacture of bricks, tiles, and blocks.

2155. William Carron. An improvement or improvements in signalling or communicating intelligence.

2179. Aristide Michel Servan. Improvements in distilling fatty and oily matters.

2183. Stephen Neal, William Blanchard Jerrold, and Conrad Montgomery. Improvements in machinery for the manufacture of casks and barrels. A communication.

2186. George Peabody. Improved machinery for dressing and warping yarns. A communication.

2187. Alfred Vincent Newton. An improved method of forming seams and ornamental stitching, and in machinery for effecting such operation, part of which machinery is applicable to the form-

ing of other seams and stitches. A communication.

2188. Alfred Vincent Newton. An improved mode of constructing steam boilers, applicable also in part to the construction of condensers. A communication.

2203. Hiram Tucker. A new and useful improvement in the art or process of applying colours to a surface by means of a liquid.

2205. William Farmer. Improvements in apparatus for preserving provisions.

2209. Charles Frederick Stansbury. A new and useful method of converting fine coal into solid lumps.

2214. Robert Popple. Improvements in machinery for slubbing, roving, and spinning cotton and other fibrous substances.

2216. William Prior Sharp, John Hill, and William Martin. Improvements in machinery for spinning and doubling cotton and other fibrous substances.

2224. Joseph Fermont Van Waesberghe. The improved manufacture of artificial vinegar.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed October 12, 1853.

871. Henry Blake.

Sealed October 13, 1853.

901. John Chadwick and Thomas Dickins.
925. Joseph Cooke and William Cooke.
926. George Albermarle Cator.
933. William McNaughton.
939. Thomas Newey.
959. Thomas Dunn.
975. Jerome André Drieu.
1005. William Johnson.
1045. Colin Mather.
1089. Thomas Masters.
1258. William Chisholm.
1709. Thomas Wood and George Wade.
1750. Charles Frederick Spieker.
1882. Edward Lavender and Robert Lavender.
1928. Joseph Hart Mortimer.
1935. Peter Fairbairn.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

NOTICE TO CORRESPONDENTS.

W. Skelton, of Grimsby, asks "if the weight of a train, on a level railway, is the same when at rest as when in motion; and, if so, why?" The *weight* of the train is the same in both cases, and for this reason, that the *weight* of a body depends only upon two quantities, viz., its mass (M), and the force of gravity (g). Now the *mass* of a train is certainly not changed when motion is communicated to it; and *gravity* is constant at any given place on the earth's surface; hence the *weight* must be unaffected by motion. Theoretically, the *downward pressure* of the train would be different in the two cases as a *level surface*, in its extended sense, is that of a sphere having the same centre as the earth, and a body moving along it would be affected by centrifugal force, which would diminish the force of gravity. We presume, however, that this case lies beyond the conditions which the proposer of the question had in his mind, as it is not one that need be considered in practice.

CONTENTS OF THIS NUMBER.

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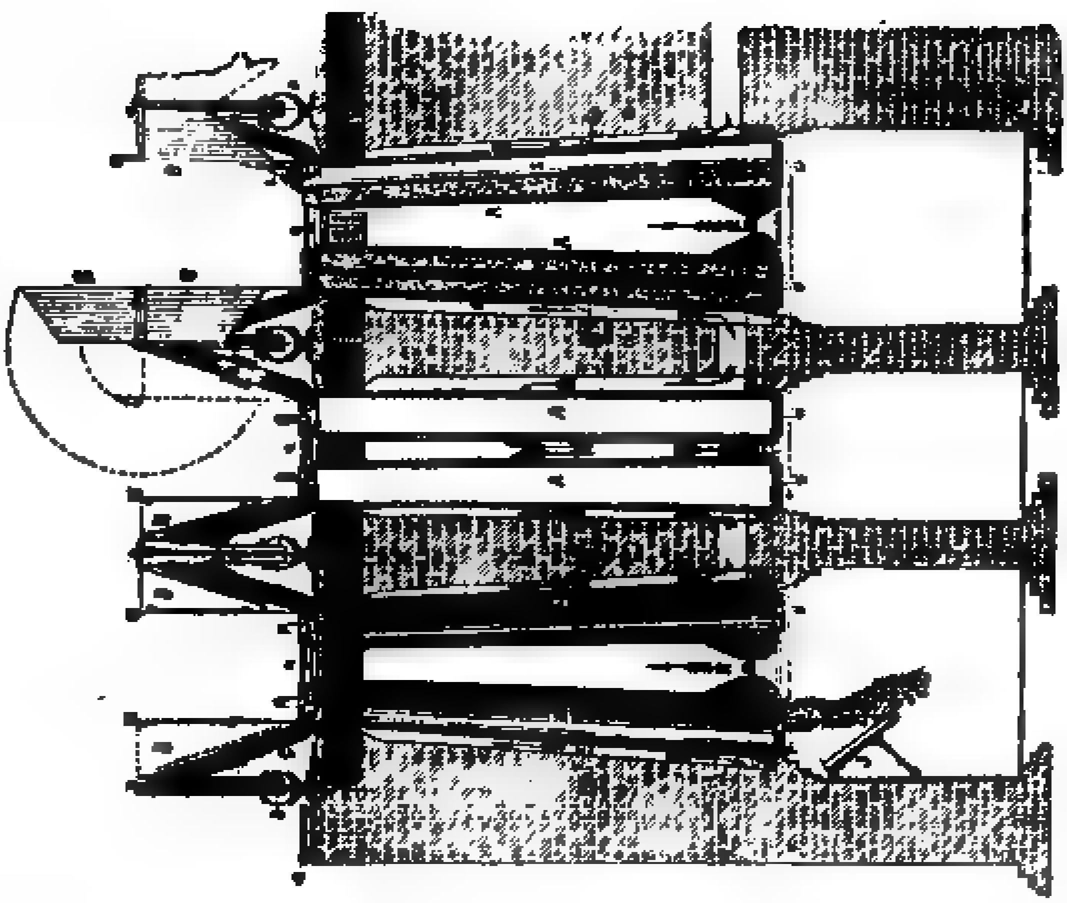
Edited by R. A. Brooman, 166, Fleet-street.

THOMAS'S PATENT GAS AND COKE RETORTS.

Fig. 2.

Fig. 1.



THOMAS'S PATENT GAS AND COKE RETORTS.

(Patent dated April 5, 1853.)

Mr. Thomas's invention consists of a new and highly advantageous method of fixing or erecting and working retorts for the destructive distillation of coal and other substances used for the production of illuminating gases and coke. The retorts may be composed of clay or iron, or of clay and iron combined; and they may be of any number, and of any shape, form, or length that may be most convenient. The arrangement represented in the accompanying engravings will be found a convenient one for large works. In this case, the retorts are arranged in a vertical position in three benches, each bench made up of twelve retorts, in two rows of six in a row. The furnaces are at the bottom of the retorts, and extend throughout the whole width of the benches, so as to insure a good and regular heating. In order to obtain the greatest amount of economy derivable from this arrangement, the two external benches of retorts are provided with a furnace to each, and the bench between them is without a furnace, but is heated by the spare heat from the bench on either side of it, so that a bed of these settings is composed of a bench with a furnace, and one without one, alternately. These retorts are charged at the top by means of hoppers placed above them, the coals being run into them down a shoot, and they are discharged at the bottom, the coke being guided into the barrow or other receptacle by means of a screen, which at the same time frees it from dust. The retorts may be divided perpendicularly by a diaphragm of perforated sheet-iron, and charged on each side alternately when caking coal is used. But the inventor prefers to employ a perforated sheet-iron tube or pipe, fixed in the centre of the retort, so as to leave an annular space to be occupied by the coal. The gas will readily escape into the perforated pipe, whilst the slight pressure to which the coke is subjected, will produce an article much more dense, and consequently more valuable than that produced by any of the methods at present in use.

Fig. 1 of the engravings annexed is a longitudinal section of a setting of retorts arranged according to this invention, fig. 2 an elevation of the same, and fig. 3 a cross section. The same letters refer to the same parts in each figure. A A are the retorts, which are represented as of an oval shape, 11 ft. 6 ins. long, 18 ins. × 10 ins. wide at top, and 20 ins. × 12 ins. at bottom, although any other form may be substituted. They are fixed perpendicularly, or nearly so, and, from being larger at bottom than top, discharge the coke with much ease. They are composed of clay; although iron may be substituted, particularly in the setting without a furnace. B B are the coal-hoppers, from which the coals are discharged into the retorts by means of the shoot, L, which runs on an iron rod along the front of the hoppers. C C are the ascension and dip-pipes, so arranged that one of the latter, by being divided longitudinally, serves for two of the former. They are covered with a cap, to facilitate cleaning them out, and the joint, C^2, is so made as to yield to the retort in case of shrinking or otherwise. D is the hydraulic main, placed under the coal-hoppers. E E are small conducting-pipes, leading from the hydraulic main to the large conducting-pipe. F is the large conducting-pipe, leading to the condenser. G G are firing-doors, through which the coke or other fuel, in any quantity, may be shot into the furnaces, thus obviating the necessity of frequently opening the fire-doors, and effecting consequently a saving of fuel. H H are clinkering-doors, which are built up of fire-lumps, and taken down when required. I I are the air-flues, J the coke-screen, and K K the tar-pipes for conveying the tar from the hydraulic main, which may be placed near the top of the retort-bed, instead of in the position shown in the engravings. M is the clinkering-floor. In the case of two beds running parallel in one house, this floor would be continued from one to the other. N is the firing and charging-floor, composed of fire-tiles. An air-space, Q, of four or five inches, is left between this floor and the top of the retort-bed, for the purpose of keeping it cool. O is a ventilating-flue, for the purpose of drawing off the heat and flame given out by the retorts during the process of charging, and also for increasing the circulation of air in the space, Q, under the charging-floor. P is the horizontal flue, leading from the furnaces to the chimney. R R are the furnaces, which, together with the retorts, are carried on wrought-iron T-bars, and have a shallow sheet-iron ash-pan underneath, which is fixed in such a manner that it can be pushed on one side when the bars require attending to. The products of combustion, after passing from the furnaces to near the top of the retorts, descend on the other side of them, and then passing through the partition wall, heat one-half of the next setting, the other half being heated in like manner from the setting on the other side of it. The partially-exhausted heat from the two benches containing furnaces meets in the centre of the retorts at top of the bench without a furnace, and then descending, heats that bench, and passes off to the chimney by the flue, T, as shown by the arrows. By this

arrangement, each alternate setting of twelve, or other number of retorts, is heated by the heat from the settings on each side of it, thus economizing the fuel to its utmost extent.

Fig. 3.

In charging these retorts, it is intended to remove and replace the top lids by means of an iron crowbar, which is inserted into a loop on the top of each of the lids, the bar being just passed through the ring of a chain, which is suspended from the roof of the retort-house, and serves as a fulcrum to the bar, by means of which the lids are removed and replaced as required. The bottom lid is secured at one side by a hook, which takes into a staple or eye on the side of the mouth-piece, and on the other side it is temporarily supported by a catch whilst applying the cotter, as shown in the figures.

METEOROLOGICAL OBSERVATIONS AT SEA.

The Brussels Conference, appointed to investigate the above subject, and to form plans for collecting and collating facts having reference to it, has published the following Report. The matter is at the present exciting great interest among maritime men, and is certain to effect important changes in the intercourse of the commercial nations. It is very gratifying to find that the meritorious exertions of Lieutenant Maury, of the United States' Navy—so long restricted by the supineness of sea-captains and others who possessed the power of assisting his inquiries—have at last succeeded in attracting the attention and securing the co-operation of the United States, British, and most other Governments. We publish the Report at length, in order to convey to our readers the fullest information obtainable upon so considerable a topic:

"In pursuance of instructions issued by

the Governments respectively named below, the officers whose names are hereunto annexed assembled at Brussels for the purpose of holding a conference on the subject of establishing a uniform system of meteorological observations at sea, and of concurring in a general plan of observation on the winds and currents of the ocean, with a view to the improvement of navigation, and to the acquirement of a more correct knowledge of the laws which govern those elements.

"The meeting was convened at the instigation of the American Government, consequent upon a proposition which it had made to the British Government, in reply to a desire which had been conveyed to the United States that it would join in a uniform system of meteorological observations on land, after a plan which had been prepared by Captain James, of the Royal Engineers, and submitted to the Government by Sir J. Burgoyne, Inspector-General of Fortifications.

"The papers connected with this correspondence were presented to the House of Lords on the 21st of February last, and have been further explained in the minutes of the conference. And it is here merely necessary to observe, that some difficulties having presented themselves to the immediate execution of the plan proposed by the British Government, the United States availed themselves of the opportunity afforded by this correspondence of bringing under the notice of the British Government a plan which had been submitted by Lieutenant Maury, of the United States' navy, for a more widely-extended field of research than that which had been proposed; a plan which, while it would forward the object entertained by Great Britain, would, at the same time, materially contribute to the improvement of navigation and to the benefit of commerce.

"An improvement of the ordinary sea route between distant countries had long engaged the attention of commercial men, and both individuals and nations had profited by the advances which this science had made through a more correct knowledge of the prevailing winds and currents of the ocean. But experience had shown that this science, if it did not now stand fast, was at least greatly impeded by the want of a more extended co-operation in the acquirement of those facts which were necessary to lead to a more correct knowledge of the laws which govern the circulation of the atmosphere and control the currents of the ocean; and that the subject could not receive ample justice, nor even such a measure of it as was commensurate with the importance of its results, until all nations should concur in one general effort for its perfection. But, could that happy event be brought about—could the observations be as extensive as desired, and receive that full discussion to which they were entitled, the navigator would learn with certainty how to count up the winds and currents in his track, and to turn to the best advantage the experience of his predecessors.

"Meteorological observations, to a certain extent, had long been made at sea, and Lieutenant Maury had turned to useful account such as had from time to time fallen into his hands; but these observations, although many of them good in themselves, were but isolated facts, which were deprived of much of their value from the absence of observations with which they could be compared, and, above all, from the want of a constant and uniform system of record, and from the rudeness of the instruments with which they had been made.

"The moment, then, appeared to him to have arrived when nations might be induced to co-operate in a general system of meteorological research. To use his own words, he was of opinion that 'the navies of all maritime nations should co-operate, and make these observations in such a manner and with such means and implements, that the system might be uniform, and the observations made on board one public ship be readily referred to, and compared with the observations made on board all other public ships, in whatever part of the world; and, moreover, as it is desirable to enlist the voluntary co-operation of the commercial marine, as well as that of the military of all nations, in this system of research, it becomes not only proper, but politic, that the forms of the abstract log to be used, the description of the instruments to be employed, the things to be observed, with the manipulation of the instruments, and the methods and modes of observation, should be the joint work of the principal parties concerned.'

"These sentiments being concurred in by the Government of the United States, the correspondence between the Governments was continued, and finally each nation was invited to send an officer to hold a conference at Brussels on a given day.

"And that the system of proposed observation and of combined action might become immediately available, and be extended to its widest possible field of operation, it was determined to adapt the standard of the observations to be made to the capabilities of the instruments now in general use in the respective naval services, but with the precaution of having all these instruments brought under the surveillance of parties duly appointed to examine them

and determine their errors; as this alone would render the observations comparable with each other through the medium of their respective standards.

"The conference opened its proceedings at Brussels on the 23rd of August, 1853, in the residence of M. Piercot, the Minister of the Interior, to whom the thanks of the conference are especially due.

"M. Quetelet was unanimously elected president.

"Before entering upon any discussion, it was the desire of all the members of the conference that it should be clearly understood that in taking part in the proceedings of the meeting they did not in any degree consider themselves as committing their respective Governments to any particular course of action, having no authority whatever to pledge their country in any way to these proceedings.

"The object of the meeting having been explained by Lieutenant Maury, the conference expressed its thanks to that officer for the enlightened zeal and earnestness he had displayed in the important and useful work which forms the subject of the deliberations of the conference.

"In concerting a plan of uniform observation, in which all nations might be engaged, the most obvious difficulty which arose was from the variety of scales in use in different countries. It is much to be desired that this inconvenience should be removed; but it was a subject upon which the conference, after mature deliberation, determined not to recommend any modification, but to leave to each nation to continue its scales and standards as heretofore, except with regard to the thermometers, which it was agreed should, in addition to the scale in use in any particular service, have that of the centigrade placed upon it, in order to accustom observers in all services to its use, with a view to its final and general adoption.

"The advantages of concert of action between the meteorologist on land and the navigator at sea were so obvious, that, looking forward to the establishment of a universal system of meteorological observation upon both elements, it was thought that the consideration of scales could with greater propriety be left for that or some such occasion.

"As to the instruments to be recommended, the conference determined to add as few as possible to such as were in common use in vessels of war; but, regarding accuracy of observation as of paramount importance, the conference felt it to be a matter of duty to recommend the adoption of accurate instruments, of barometers and thermometers especially that have been carefully compared with recognised standards, and have had their errors accurately determined; and that such instruments only should be used on board every man-of-war co-operating in this system, as well as on board any merchantman, as far as it may be practicable.

"The imperfection of instruments in use at sea is notorious. The barometer having hitherto been used principally as a monitor to the mariner—to warn him, by its fluctuations, of the changes in prospect—its absolute indication of pressure has been but little regarded; and makers seldom, if ever, determined the real errors of these instruments, or, if known, still more rarely ever furnished the corrections with the instruments themselves.

"That an instrument so rude and so abundant in error as is the marine barometer generally in use should, in this age of invention and improvement, be found on board any ship, will doubtless be regarded hereafter with surprise; and it will be wondered how an instrument so important to meteorology and so useful to navigation should be permitted to remain so defective, that meteorologists, in their investigations concerning the laws of atmospheric pressure, are compelled, in great measure, to omit all reference to the observations which have been taken with them at sea. The fact will, it is believed, afford a commentary upon the marine barometers now in use which no reasoning or explanation can render more striking.

"It was the opinion of the conference that it would not be impossible, considering the spirit of invention and improvement that is now abroad in the world, to contrive a marine barometer, which might be sold at a moderate price, that would fulfil all the conditions necessary to make it a good and reliable instrument; and a resolution was passed to that effect, in order to call the attention of the public to the importance of an invention which would furnish the navigator with a marine barometer that at all times, and in all weathers at sea, would afford the means of absolute and accurate determinations.

"The conference is also of opinion that an anemometer, or an instrument that will enable the navigator to measure the force, velocity, and direction of the wind at sea, is another desideratum.

"The conference was of opinion, that the mercurial barometer was the most proper to be used at sea for meteorological purposes, and that the aneroid should not be substituted for it.

"With regard to thermometers, the conference does not hesitate to say, that observations made with those instruments, the

errors of which are not known, are of little value, and it is therefore recommended, as a matter well worth the attention of co-operators in this system of research, whether some plan may not be adopted in different countries for supplying navigators, as well in merchantmen as in men-of-war, with thermometers the errors of which have been accurately determined.

"For the purposes of meteorology various adaptations of the thermometer have been recommended, such as those which refer to hygrometry and solar radiation; and, accordingly, a space will be found in the columns for temperature by thermometers with dry, wet, and coloured bulbs. With these exceptions, the only instrument, in addition to those generally used at sea, for which the conference has thought proper to recommend a column, is that for specific gravity; the cost of this instrument is too insignificant to be mentioned.

"The reasons for recommending the use at sea of the wet, the white, and black bulb thermometers are obvious; but with regard to the thermometer with a bulb the colour of seawater, and the introduction on board ship of a regular series of observations upon the specific gravity of seawater, it may be proper to remark that, as the whole system of ocean currents and of the circulation of seawater depends in some degree upon the relative specific gravities of the water in various parts of the ocean, it was judged desirable to introduce columns for this element, and to recommend that observations should be carefully made with regard to it, both at and below the surface.

"With respect to the thermometer having a bulb of the colour of seawater, it is unnecessary to say more in favour of its use on board ship than that the object is to ascertain whether or no such observations will throw any light upon the psychrometry of the sea, or upon any of the various interesting phenomena connected with the radiation from the surface of the ocean.

"In bringing to a conclusion the remarks upon instruments, the conference considered it desirable, in order the better to establish uniformity and to secure comparability among the observations, to suggest as a measure conducive thereto, that a set of the standard instruments used by each of the co-operating Governments, together with the instructions which might be given by such Governments for their use, should be interchanged.

"The object of the conference being to secure as far as possible uniformity of record and such a disposition of the observations that they would admit of ready comparison, the annexed form of register was concerted and agreed upon. The first columns of this form will receive the data which the Government of the United States requires merchant vessels to supply, in order to entitle them to the privileges of co-operators in this system of research, and may therefore be considered as the minimum of what is expected of them. This condition, which it may be as well to state here, requires that at least the position of the vessel and the set of the current, the height of the barometer, the temperature of the air and water, should each be determined once a day, the force and direction of the wind three times a day, and the observed variation of the needle occasionally.

"Every abstract log kept by a merchant vessel should contain at least what is here recommended. Anything more would enhance its value and make it more acceptable.

"The remaining columns are intended principally for men-of-war to fill up in addition to those above mentioned; but it is believed that there are many officers in the mercantile navy also who are competent to this undertaking, and who will, it is hoped, be found willing to distinguish themselves in this joint action for the mutual benefit of the services.

"In the compilation of this form the conference has had carefully in view the customs of the service and the additional amount of attention which these duties will require, and it is believed that the labour necessary for the purpose, at least to the extent specified in the instructions for filling up the columns, is only such as can be well performed under ordinary circumstances, and it has considered it a minimum, and looks with confidence to occasional enlarged contributions from zealous and intelligent labourers in the great cause of science.

"The directions for filling up the columns, and for making certain observations, it will be seen by the minutes, were limited to such only as seemed necessary to the conference to insure uniformity of observation. The subject received the benefit of much discussion before the meeting; and it was considered most advisable to confine the matter to hints, which it is hoped will be found sufficient, when embodied in the instructions which each nation will probably issue with the forms, to insure that most desirable end—uniformity.

"The conference, having brought to a close its labours with respect to the facts to be collected, and the means to be employed for that purpose, has now only to express a hope that, whatever observations may be made, will be turned to useful account when received, and not be suffered to lie dormant for the want of a department to discuss

them; and that should any Government, from its limited means, or from the paucity of the observations transmitted, not feel itself justified in providing for their separate discussion, it is hoped that it will transfer the documents, or copies of them, to some neigbouring Power, which may be more abundantly provided and willing to receive them.

"It is with pleasure that the conference has learnt that the Government of Sweden and Norway has notified its intention of co-operating in the work, and that the King has commanded the logs kept by his Swedish subjects to be transmitted to the Royal Academy of Science at Stockholm; and also that in the Netherlands, Belgium, and Portugal, measures have been taken to establish a department for the same purpose, and that the Admiralty of Great Britain has expressed its intention of giving instructions for meteorological observations to be made throughout the Royal Navy.

"The conference has avoided the expression of any opinion as to the places or countries in which it would be desirable to establish offices for the discussion of the logs; but it is confidently hoped that, whatever may be done in this respect, there will be always a full and free interchange of materials, and a frequent and friendly intercourse between the departments; for it is evident that much of the success of the plan proposed will depend upon this interchange, and upon the frankness of the officers who in the several countries may conduct these establishments.

"Lastly; the conference feels that it would but inadequately discharge its duties, did it close this Report without endeavouring to procure for these observations a consideration which would secure them from damage or loss in time of war, and invites that inviolate protection which science claims at the hands of every enlightened nation; and that, as vessels on discovery or scientific research are by consent suffered to pass unmolested in time of war, we may claim for these documents a like exemption; and hope that observers, amid the excitement of war, and perhaps enemies in other respects, may in this continue their friendly assistance, and pursue their occupation, until at length every part of the ocean shall be brought within the domain of philosophic research, and a system of investigation shall be spread as a net over its surface, and it become rich in its benefit to commerce, navigation, and science, and productive of good to mankind.

"The members of the conference are unwilling to separate without calling the attention of their respective Governments to the important and valuable assistance which it has received from the Belgian Government. That the conference has been enabled to draw its labours to so speedy and satisfactory a close is in a great measure owing to the facilities and conveniences for meeting and deliberating which have been afforded by His Majesty's Government.

"Signed at Brussels, this 8th day of September, 1853:

"Belgium ..	QUETELET, President. LAHURE.
"Denmark ..	P. ROTHE.
"France ..	DELAMARCHE,
"Gt. Britain,	F. W. BEECHEY. H. JAMES.
"Netherlands,	JANSEN.
"Norway ..	IHLEN.
"Portugal ..	DE MATTOS CORREA.
"Russia ..	GORKOVENKO.
"Sweden ..	PETTERSSON.
"United States,	MAURY."

AMERICAN DRUG-GRINDING MACHINE.

(Patent dated April 12, 1853, as a communication to Mr. R. A. Brooman.)

THIS machine is an improvement upon the mills commonly used for grinding gums, gum resins, and other drugs, or articles of a similar character. It possesses the advantage of not only disintegrating these substances with great rapidity, but also of producing the required impalpable powder in one operation, thus obviating the necessity of submitting the matter to the usual additional process known as "dusting."

The construction of the improved mill is represented in figs. 1 and 2 of the engravings annexed, and is as follows:—A circular bed-stone is made, of granite or other suitable material, rising in the centre in the form of a cone, as shown at *a*. This conical form is employed for the purpose of enabling the advancing edge of the muller, which has a plane surface, to pass over or mount upon the material submitted, instead of pushing that away, as would be the case were both surfaces plane. The bed-stone thus formed is firmly fixed upon a suitable frame, and surrounded with a curb of wood, *b*, as usual in the class of mills known as "chasers." A shaft, *c*, passes through a suitable opening in the bed-stone, and is made to revolve by appropriate connection with any first motor. Upon the bed-stone are placed one or more

"mullers," *d*, which are composed of granite or other suitable material. The face in contact with the bed-stone is a circular plane, of a diameter rather less than a

Fig. 2.

Fig. 1.

radius of the bed-stone, and the muller is diminished in size towards the upper end, in order that it may not come in contact with the curb, in the manner shown in

fig. 1. In the centre of the upper end of the muller a hole, e, is drilled, extending downward nearly to the face and at right angles with it. In this hole a spindle is firmly fixed, and upon this the muller revolves in the ends of an arm, f, extending from the shaft, c. The arm is placed a short distance above the muller, in order that when the feed happens to be too abundant the muller may be permitted to rise over it. Upon one of the arms, f, is placed a lever, standing in a vertical position, or nearly so, as seen at g. It has play upon a pin, g^1, and upon the head of the spindle is an adjustable screw, the head of which works into a cranked arm of the lever, g, as shown. The lever strikes against a pin projecting from a vibrating rod, k, imparting to that rod a motion similar to that of the usual damsel or beater employed for regulating the feed in mills of this class. The curb may be of any height suitable to the substance to be reduced, and the whole is enclosed in a tight casing.

The operation of the mill is as follows:—Rotary motion being given to the shaft, the mullers are driven round by the spindles, and bear upon the bed-stone only on the line of a radius; the bed receding from the face of the muller on both sides in a curve, as seen in fig. 2 (which is a section on the line, x x, of fig. 1), and as by reason of the conical form of the bed the flat surface of the muller is more nearly in contact with the bed on the outer portion, as at m, than on the inner at n, the onward motion of the muller causes it to revolve upon the spindle. A simple forward movement would have the effect only of rubbing the substances introduced between the stones, but as a point on the periphery of the face of the muller will describe a hypocycloid upon the material on the bed-stone, the material will then be also ground or cut. Although in the mills in common use the particles of many substances, as rhubarb, &c., are obtained light enough to rise over the curb, they are yet susceptible of further disintegration by the simple operation of the "duster." In this machine the muller is constantly assuming a new line of bearing on the conical surface of the bed-stone, and the substances between are reduced by a rotating grinding motion on the line of contact.

If the material be supplied too rapidly and accumulated beneath the muller, that will rise, the spindle moving upward through the arm, f, causing the upper end of the lever, g, to be thrown toward the centre, and in this position it will pass the pin on the vibrating rod without touching it, and thus the feed would cease for a time.

A DYNAMICAL PROBLEM.

To the Editor of the Mechanics' Magazine.

Sir,—Having the pleasure of reading your Magazine regularly, I am not ignorant of the great display of mathematical skill, &c., &c., that was induced by the "Exciseman's Staff Question;" nor, indeed, am I anxious that the question which I am about to submit should lead to another such contest. Indeed, I am quite sure it will not, providing one of your correspondents who is competent to answer it (and I am convinced that you have many such) will do me the favour to give me and your readers generally an early solution of it. It is simply this:—A ladder (considered as a beam), of a given weight, falls from an upright position about its lower end. I should be very glad to be told when the foot of the ladder will begin to slide, and how far it will slide before the ladder altogether reaches the ground? If you will allow me the opportunity, Sir, of soliciting an investigation of these points from your correspondents, I shall feel much indebted to you.

I am, Sir, yours, &c.,

Q.

Oct. 15, 1853.

GEOMETRICAL INQUIRY.

To the Editor of the Mechanics' Magazine.

Sir,—I should feel extremely obliged to any of your mathematical subscribers if they would kindly determine for me the following question, which I will, with your kind permission, attempt to state accurately. I wish to make a barrel, the sections of which, both perpendicular to, and through its axis, shall be circles of any given radii. I also want to make the barrel of a given number of staves, all of the same size; but the only material I have of which to form it is plank, of the same thickness as that I wish to be given to the barrel. Now, what I want to know is:—1. Whether I can form the barrel-staves out of my material, supposing it capable of being bent into any form which a thin, flat substance, such as paper, could be made to assume: and if so, 2, how am I to determine the form of the edges of the staves, so as to be able to "line out" (as we mechanics say) each stave? Observe, Sir, I do not want a practical solution of these questions, but a mathematical one, as I am anxious thereby to get an addition to my present little stock of mathematical knowledge, which some of your able correspondents have at various times helped me to acquire, and which might have been greater, perhaps, had I attended more to their teachings. However

that may be, I am much indebted both to them and to you, Sir, and should feel a further obligation laid upon me, if they will have the goodness to help me in this little difficulty.

I am, Sir, yours, &c.,
A CONSTANT READER.

Oct. 18, 1853.

PHOTOMETRIC DISCOVERY.

A LETTER from Berlin says,—"It is well known that the paper prepared for photography grows more or less black by rays of light falling on it. One of our young painters, M. Schall, has just taken advantage of this property in photographic paper to determine the intensity of the sun's light. After more than 1,500 experiments, M. Schall has succeeded in establishing a scale of all the shades of black which the action of the solar light produces on the photographic paper; so that, by comparing the shade obtained at any given moment on a certain paper with that indicated on the scale, the exact force of the sun's light may be ascertained. Baron Alexander von Humboldt, M. de Littnow, M. Dove, and M. Pongendorff have congratulated M. Schall on this invention; which will be of the highest utility not only for scientific labours, but also in many operations of domestic and rural economy."—*Athenæum.*

Industrial Drawing: comprising the Description and Uses of Drawing Instruments, the Construction of Plane Figures, the Projections and Sections of Geometrical Solids; Architectural Elements, Mechanism, and Topographical Drawing; with Remarks on the Method of Teaching the Subjects. By D. H. MAHAN, LL.D., Professor of Civil Engineering, &c., &c., in the United States' Military Academy, New York. Trübner and Co.: London.

On a cursory view of this work, we were disposed to complain of its seeming inutility on the ground that the information it contains is ordinarily communicated orally to those who have the benefit of teachers, while it could only prove a source of trouble and confusion to unassisted students, since the author employs throughout it many technical terms of science without at all defining them. On a more careful examination of it we are, however, on the contrary, induced to believe that it will be found a very useful hand-book for teachers themselves, and an invaluable one for the assistance it will render pupils in their private labours during the intervals of academic study. The author's plea for leaving many terms undefined, and his suggestions upon the supply of the deficiency are quite satisfactory. He says: "The omission, for the most part, of these definitions was rendered necessary to bring the cost of the work within the range of that of ordinary school-books, in order that its chief object, as a work of elementary instruction, might not be defeated. Any want of acquaintance with such terms can be readily supplied by an intelligent teacher, as occasion may require, by oral explanations; or, still better, by large diagrams of the plane figures referred to, and models of the other objects placed before the pupil during the lesson. These explanations it might be well to accompany, at the outset, by a practical exercise on the part of the pupil, in requiring him to draw by the eye alone, either at a black board or on a slate, the various diagrams with the names over them. By this means both the object represented and its name would be better impressed on the student's mind, whilst at the same time the eye and the hand would be gradually educated together in judging of and representing the relative positions of lines, with the forms and relative dimensions of the component parts of objects."

The necessity of Dr. Mahan's work being accompanied with oral explanations, nevertheless renders it imperfect, and, of course, prevents competition between it and more complete treatises, such as the "Engineer and Machinists' Drawing-book," now publishing by Blackie and Son, which comprises an entire course of practical instruction, so that by the study of it alone one may pursue the subject to the end. We cannot, however, do other than express our sense of the ability with which the author has developed the processes of mechanical drawing, and are glad to be able to recommend the work as the production of one who has acquired by experience not only the necessary information, but also the mode of communicating it to others with the greatest advantage. The title so far expresses the nature of the work, that we need not trouble ourselves to epitomize its contents.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

WILLIAM MOSELEY, architect, of Cumberland-terrace, Regent's-park. *A new method of railway traction, to be called "A*

Pony Railway." Patent dated April 8, 1853. (No. 846.)

This invention has particular reference to lines of railway on which the double journey is performed in less time than the interval that elapses between the starting of the trains. The inventor employs two atmospheric tubes laid parallel to and between the rails, for the purpose of supplying traction-power to the carriages, one such tube being in course of exhaustion while the other is employed in the propulsion of the train; so that on the arrival of the train at the end of its journey the connection between the carriages and the tube may be transferred to that which has just been exhausted, and the train start on its back journey immediately.

GEORGE HUMPHREY, engineer, of Brighton. *An improved self-acting safety-valve for locomotive, marine, and other steam-boilers.* Patent dated April 8, 1853. (No. 847.)

The invention consists in securing a spring to the short end of the valve-lever, in order to ensure the action of the valve, notwithstanding that it may have been additionally weighted.

ALEXANDER SAMUEL BRADEN, of High-street, Islington, Middlesex. *Improvements in apparatus for roasting coffee, cocoa, and other vegetable matters, and for cooling the same when roasted.* Patent dated April 8, 1853. (No. 848.)

Claims.—1. The application of a rotating metal tube, heated by suitable means, and revolving within a suitable case, for the purpose of roasting the substances named, and the combination therewith of suitable stirrers and a guide-plate, as described.

2. The cooling of coffee, cocoa, and other vegetable matters, by placing them upon a reticule surface, arranged and operated, as explained.

HENRY OLIVER ROBINSON, of Moorgate-street, London. *Improvements in machinery for crushing sugar-canes.* Patent dated April 8, 1853. (No. 851.)

Claims.—1. "The combination of a steam engine and connecting gear (for driving a sugar-mill) upon a base-plate, or foundation-plate, common to both, and adapted to be united to the base-plate of an ordinary sugar-mill, the fly-wheel and the gear being all above the base or foundation-plate; also the applying inside gearing between the steam engine and the sugar-mill, as described."

2. A certain connection or coupling.

GEORGE HERBERT, of Summerhill, Dartford, Kent. *Improvements in constructing and mooring light-vessels, buoys, and other similar floating bodies.* Patent dated April 8, 1853. (No. 852.)

Claim.—The construction of light-vessels, buoys, and such like floating bodies, with concave bottoms, and suitable arrangements for mooring from the upper parts of such concave bottoms.

JOSHUA FARRAR, of Marsden, York, mill-owner. *Improvements in the treatment of flax, line, grasses, and other fibrous substances.* Patent dated April 8, 1853. (No. 853.)

Claim.—Treating flax or other similar vegetable fibres for the purpose of removing the gummy or resinous parts from the plant, by alternately saturating the fibres with water or other liquid, and submitting them to pressure, so as to express the refuse and useless matters, as described.

STEPHEN TAYLOR, of New York, America, gentleman. *Improved machinery for weaving seamless goods.* (A communication.) Patent dated April 8, 1853. (No. 854.)

Claim.—The arrangement in one loom of two series of cams, one for weaving the cloth double, and the other for weaving it single, in combination with the shifting of the treadles from one series of cams to the other, or to its equivalent, as described.

GEORGE FREDERICK GOBLE, of Fish-street-hill, London, master mariner. *Impvovements in machinery to be actuated by water or air.* Patent dated April 9, 1853. (No. 855.)

An endless chain or band is made by the inventor to pass round three rollers or drums, two of which are placed at the surface of the water, and the third vertically above one of these; then if water is to be raised, buckets are attached to the band, and if the upper drum is to drive a shaft, floats are attached to the band, both buckets and floats being made to dip into a running stream and move along on it between the two lower drums. The action will therefore be readily understood in each case. A modification of this arrangement is applied to windmills.

HERBERT TAYLOR, of Mark-lane, London, merchant. *Improvements in ornamenting surfaces or fabrics applicable to various useful purposes, such as for covers of furniture, imitation tapestry, carpets, or hangings.* (A communication.) Patent dated April 9, 1853. (No. 857.)

Claims.—1. The painting upon cloth, previously prepared with a mordant that will combine chemically with the colours laid on one over another, and blended, as described.

2. Developing and fixing the colours permanently by steam, and restoring the cloth to its natural pliable state by washing out the gum and excess of colouring matter, as described.

The patentee remarks, that any ordinary steaming-apparatus will serve the purpose, and that chloride of limewater is used to

oxidate and combine the mordant of tin with the cloth.

ADOLPHE MARIUS ALEXANDRE IGLESIA, of Fitzroy-square, Middlesex, mechanic. *Improvements in producing ornamental glass surfaces.* Patent dated April 9, 1853. (No. 858.)

Claims.—1. Ornamenting glass surfaces with various devices, by applying to it paper or other suitable flexible material, on which may be printed, lithographed, drawn, or coloured the desired device.

2. Certain methods of strengthening or consolidating such ornamented glass, by applying a mastic thereto.

WILLIAM PENN CRESSON, of Philadelphia, United States. *Improvements in lathes and parts connected therewith, for the purpose of reducing and smoothing the surfaces of certain metal wares.* (A communication.) Patent dated April 9, 1853. (No. 859.)

The patentee describes and claims certain mechanical arrangements, the object of which is that the article may be so governed in its rotary motion that the cutting and smoothing instruments shall follow the form of the article operated upon, and any departure from a true surface in such forms, resulting from shrinking in cooling after casting, so that the tool shall take off only one uniform quantity from each part thereof, or as nearly so as may be.

JOHN FULLER BOAKE, of Dublin, lampist, and JOHN REILY, of Dublin, mechanic. *Improvements in signal-posts for railways, and in apparatus connected therewith.* Patent dated April 11, 1853. (No. 861.)

Claims.—1. The construction of signal-posts of iron lattice-work, as described.

2. Certain means described of raising and lowering the lamp.

3. A certain method of working the signals, by means of the traction of wires.

ROBERT BOSTWICK RUGGLES, of Paterson, New Jersey, and LEMUEL WRIGHT SERRELL, of New York, both of the United States. *Improvements in machinery for beating gold and other laminæ of metal.* Patent dated April 11, 1853. (No. 862.)

The object of this invention is to furnish means for beating laminæ of metal by machinery, so as to produce the same effects as when hand-labour is employed. The patentees describe and claim a machine constructed for this purpose; but no provision is made for the accompanying processes of "rifling" and "annealing."

WILLIAM URQUHART, of Great Queen-street, Lincoln's-inn-fields, Middlesex. *Improvements in the manufacture of printers' type, and other articles used in letter-press printing.* Patent dated April 11, 1853. (No. 864.)

Claims.—1. "The cutting of punches to be used in the manufacture of type, by forming such said punches with whole words, or parts of words, or terminations," as described.

2. A mode of constructing cases intended to contain such type, and of arranging the latter in such cases.

WILLIAM RUSSELL PALMER, of Elizabeth, North Carolina. *Improvements in the construction and arrangement of machines for the application of horse-power, which he designates as "Palmer's improved horse-power."* Patent dated April 11, 1853. (No. 865.)

This invention consists in increasing the length of the arms or levers of revolving machines, driven by horse-power, and in applying the power to machinery from the ends of the long arms by means of a band or bands "playing in points of support," attached to the ends of such arms. The inventor claims the several parts of his apparatus.

WILLIAM RUSSELL PALMER, of Elizabeth, North Carolina. *Improvements in machines for threshing seeds and grains, and for cleaning them from the straw and chaff after they are threshed, which he designates as "Palmer's American seed and grain-thresher and winnower."* Patent dated April 11, 1853. (No. 866.)

Claims.—The construction of a "rotary," formed of a series of arms or flails radiating from and securely fastened to a central drum, and of certain "mill-like furrowed surfaces of the flanches and rubbers," and their disposition on opposite sides of the trough or flail-case, together with the arrangement and combination of the rubbers.

HENRY BLAKE, of London-road, Brighton, Sussex. *Improvements in railway wheels.* Patent dated April 12, 1853. (No. 871.)

This invention consists in a new mode of combining wood and metal together in the construction of railway wheels.

Claim.—The use and application of "kamptulicon," or other suitable elastic substance, in the construction of the felloes of railway wheels, by placing it between the ends of the wood segments which compose the said felloe.

RICHARD ARCHIBALD BROOMAN, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agents. *Improvements in grinding and pulverizing gums, gum-resins, and other drugs and articles of a similar character.* (A communication.) Patent dated April 12, 1853. (No. 872.)

A full description of this invention is given in a former part of this Number.

HENRY WILLIAM HARMAN, of Northfleet Dockyard, Kent, civil engineer. *Improvements in steam engines.* Patent dated April 12, 1853. (No. 874.)

Claims.—1. The general arrangement and construction of steam engines, as described.

2. A mode of constructing steam engines, wherein the piston rods pass through and are supported by the condensers, and work the air-pumps and the other minor pumps therein, whilst the connecting-rods return from external crossheads through the condenser-trunks to the cranks.

3. A mode of arranging steam engines with the bilge and hot-water pumps inside the condenser, as described.

4. A mode of constructing marine steam engines with the condensers and pumps balancing the steam cylinders on opposite sides of the engine-shaft or keel-line of the vessel, with the air and other pumps worked inside the condensers, direct from the crosshead movement.

Thomas Greenwood, of Little Alie-street, Goodman's-fields, Middlesex. *Improvements in evaporating saccharine fluids.* Patent dated April 12, 1853. (No. 878.)

This invention consists of applying in vacuum-pans a succession of what may be called heating planes or surfaces, one above another, each consisting of a coil or series of steam passages arranged in such a manner that three or more of such planes may be brought into action in succession, as a vacuum-pan is more and more filled with fluid.

François Felix Verdie, manufacturer, of Lorette, Loire, France. *Certain improvements in welding cast steel with iron, steel, cast iron, and other metals.* Patent dated April 12, 1853. (No. 880.)

Claim.—The welding of cast steel with iron, steel, cast iron, and other metals, by first heating the article, then coating with borax, and afterwards pouring cast steel on to it in a suitable mould, and then subjecting it to a rolling or hammering process.

Robert John Kaye, of Bury, Lancaster, letter-press printer, and John Ormerod Openshaw, of Roach Mount, near Bury, Lancaster, woollen manufacturer. *Improvements in obtaining motive power by electro-magnetism.* Patent dated April 12, 1853. (No. 881.)

Claims.—1. Arranging a series of stationary magnets in magnetic motive-power engines so that the poles of the said circle form a circle within which the keepers or armatures revolve.

2. Fixing the keepers or armatures between two wheels or discs fixed upon the shaft of the engine.

3. Certain methods of producing and cutting off the communication between the batteries and the magnets.

4. The adaptation of several ranges of magnets, with respective keepers, upon the same shaft; such ranges acting simultaneously with the first of the series.

5. A certain method of reversing the engine.

6. The governing of the speed of magnetic engines by raising and lowering wires of different degrees of immersion in a fluid constituting the connection between the batteries and the magnets.

Eliza Cunnington, of Devizes, Wilts, spinster. *Improvements in the decoration of furniture panels and other surfaces.* Patent dated April 12, 1853. (No. 882.)

The inventress describes and claims a mode of decoration consisting of the employment of certain natural productions, such, for example, as mosses and ferns, which she takes when fresh gathered, and after spreading them on sheets of paper, arranges the leaves, stems, and filaments, so that after being submitted to pressure, they will present a graceful and artistic appearance. They are then pressed and dried, and afterwards dyed, coloured or coated with gold or silver leaf, or other metallic tissue, according to the tone of decoration required to be produced. The inventress then arranges them on a plain or coloured ground, either in groups, as, for instance, in imitation of forest scenery, or in the form of wreaths or borders, or otherwise as taste may dictate.

Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. *Improvements in steam boilers, and in the mode of supplying the same with water.* (A communication.) Patent dated April 12, 1853. (No. 884.)

Claims.—1. Isolating the lower portion of the water-space surrounding the furnace from the upper portion thereof, and connecting it with the tank of feed water in such manner that the water will circulate in contact with the fire-plates to cool them, and be itself heated preparatory to being pumped into the boiler.

2. A general arrangement of parts described for generating steam in locomotive boilers.

Nathaniel Clayton and Joseph Shuttleworth, of the Stamp-end Iron-works, Lincoln, agricultural engineers. *An improvement in portable and locomotive engines.* Patent dated April 13, 1853. (No. 886.)

The improvement that the inventors claim consists in placing the working cylinder or cylinders of portable and locomotive steam-engines in a steam chamber or jacket placed within the smoke-box, whereby condensation of steam within the cylinder, and radiation of heat therefrom is effectually prevented.

George Elliott and William Rus-

SELL, both of Saint Helen's, Lancaster, manufacturing chemists. *Improvements in the manufacture of alkali.* Patent dated April 13, 1853. (No. 887.)

This invention relates to two of the processes in the above-named manufacture, viz., the manufacture of black ash, and the finishing of soda-ash. The object of the invention is to adopt mechanical means for keeping the material in motion, instead of having it stirred by an attendant in the usual manner. For this purpose the material is placed in revolving cylinders, to which heat is applied, instead of in reverberatory furnaces as heretofore. The inventors claim this arrangement.

THOMAS EDWARDS, of the Islington Iron Foundry, Birmingham, Warwick, engineer. *Improvements in steam-engines.* Patent dated April 13, 1853. (No. 889.)

Claims. — 1. The general arrangement and construction of steam-engines, as described.

2. The mode of arranging and constructing duplex cylinder expansion steam-engines, in such manner that the exhaust steam from the high pressure shall enter the low pressure cylinder at or about the instant of the passage of the crank of the low pressure cylinder over its dead centre.

3. The mode of arranging combined duplex cylinder expansive steam-engines, in such manner that their respective cranks shall be disposed at any angle or position with regard to each other between a right angle and a diametrically opposite position, the lead being given to the low pressure or expansive cylinder.

4. The mode of arranging a high pressure steam-engine, to work in combination with a low pressure expansive engine, in such manner that the respective cranks shall be disposed at any given angle with regard to each other between a diametrically opposite position and a right angle lead being given to the expansive cylinder.

JAMES NOBLE, of Leeds, York, manufacturer. *Improvements in preparing cotton and other fibres.* Patent dated April 13, 1853. (No. 890.)

This invention consists in combining two rotary rings of comb or suitably-formed teeth, one ring of teeth rotating within the other, with regard to which it is placed eccentrically, so that at one point of the revolution the two rings come together. Above such rings, and on the axis of the line of the two, is a circular frame carrying bobbins with prepared cotton, or other fibres, which descend to and come between two surfaces, by which they are placed into the teeth of the revolving rings just before they come together; and when this takes place the fibres are drawn by drawing-rollers from between the teeth. As the distance apart of the two rings increases, the long fibres remaining will be retained between the teeth of one of the rings, while the teeth of the other will retain the shorter fibres, which are removed by a brush. The longer fibres are lifted out of and again placed between the teeth of the rings, and are again drawn off by the rollers.

DOUGLAS HEBSON, of Dale-street, Liverpool, Lancaster. *Improvements in working the air-pumps of steam engines.* Patent dated April 13, 1853. (No. 891.)

The inventor claims the method of making the main driving-crank of the engine so as to form an eccentric, from which motion may be conveyed to the air-pump rod by connecting the eccentric band with it.

JAMES NOBLE, of Leeds, York, manufacturer. *Improvements in preparing cotton and other fibres.* Patent dated April 13, 1853. (No. 894.)

Claim.—The causing a rotating comb to make a partial revolution on its own axis after it has taken the cotton or other fibres from suitable feeding-apparatus, and when the fibre arrives opposite a passing or travelling-comb it is delivered by a brush or other suitable instrument, as described.

CHARLES CLIFFORD, of Inner Temple-lane. *Improvements in apparatus for lowering boats evenly, and preventing them filling with water.* Patent dated April 13, 1853. (No. 895.)

In this invention "a barrel is placed under one of the seats, having two holes therein. Three ropes are employed; one which, being passed through the barrel and firmly secured therein, is wound round it. The other two ropes are fixed to the ordinary davits or apparatus at the ship's side; they pass respectively through two blocks (each having three sheaves, which may or may not rotate on axes), and then enter one hole in the barrel in opposite directions; they are otherwise left unfastened. The two blocks are fixed to diagonal ropes, which are inside, fast on either side of the boat. By this arrangement, when the first rope is pulled the barrel rotates and winds up the other two ropes to any required elevation. The first rope is then made fast to hitch-pins, or otherwise, in the boat. The lowering is effected by paying off the first-mentioned rope, thus allowing the barrel to rotate; and as soon as the boat has descended and moved to a distance equal to the length of the two ropes, they will be drawn out of the holes and through the blocks, and the boat will be free."

The inventor also proposes the combining a rotary hollow plug, with flap-valves to prevent the ingress of water when the boat

is afloat, or to retain it in the boat when necessary.

Claim.—The foregoing combinations and apparatus.

John Hinks and George Wells, of Birmingham, Warwick, manufacturers and co-partners. *An improvement or improvements in certain kinds of boxes.* Patent dated April 14, 1853. (No. 896.)

Claim.—The addition of metallic tops and bottoms, or metallic tops or bottoms to boxes made of paper, pasteboard, or card-board, for the purpose of rendering the said boxes less permeable to moisture.

Thomas Lovell Preston, of Birmingham, Warwick, machinist. *An improvement or improvements in cutting out and piercing metals.* Patent dated April 16, 1853. (No. 897.)

Claims.—The constructing a machine for cutting out and piercing blanks to be used for making chain, by means of moveable and fixed cutting dies or tools, driven by cams or eccentrics on the driving-shaft of the machine, as described.

2. The application of the machine to the cutting-out and piercing of metals for such other purposes as the same is or may be applicable to.

Moses Robinson, of Brussels, Belgium. *Certain improved means of preventing accidents on railways.* Patent dated April 14, 1853. (No. 898.)

The complete specification of this patent was filed with the application.

The inventor describes and claims certain apparatus applicable to railways, comprising; 1, a friction sleigh for reducing a train to rest, and the furniture connected with the sleigh; 2, a new arrangement of lamps in the front and rear of the train; 3, facilities for applying look-out telescopes; 4, the placing of whistles in front and rear of the train, at great elevations; 5, certain arrangements of look-out guard-boxes.

Constant Jouffroy Dumery, of Paris, France. *Improvements in the manufacture of paste and enamel buttons.* Patent dated April 14, 1853. (No. 899.)

This invention consists; 1, in rounding the holes on each side of paste and enamel buttons; and 2, in the means of manufacturing buttons, comprising a new arrangement of machinery; improvements in preparing apparatus for the pulverizing and mixing; a new means of baking by gas and moveable furnaces; an arrangement for moulding the paste while heated; and a new composition of paste.

Charles Lowe, of Sheepy-hall, Sheepy Magna, Leicester, corn-miller. *Improvements in mills for grinding wheat and other grain.* Patent dated April 14, 1853. (No. 900.)

Claim.—The formation of a stone case and spouts of cloth, wire-gauze, or any other similar substance that will allow the heated air and vapour to pass through it away from the flour, either in ordinary mills or in mills in which air-blasts, exhaust, or similar artificial means are used.

John Chadwick, of Manchester, Lancaster, silk-manufacturer, and Thomas Dickins, of Middleton, Lancaster, silk-dyer. *Improvements in the production of raw and of thrown silk.* Patent dated April 14, 1853. (No. 901.)

Claims.—1. The production of threads of silk by winding, doubling, or spinning direct from the cocoon on to a bobbin or other surface which does not involve the necessity of a loose skein.

2. In reference to winding into a hank from the cocoon, causing the latter to revolve, or the threads proceeding therefrom to pass in contact with rods or rollers.

3. Winding silk, suitable for the dyer or manufacturer, from the cocoon into a hank by causing the cocoon to revolve.

John Bethell, of Parliament-street, Westminster, gentleman. *Improvements in the manufacture of flax.* Patent dated April 14, 1853. (No. 902.)

This invention consists in dissolving out the gummy, mucilaginous, and pithy substances in the flax-straw without fermentation, and by a process very similar to the mashing process used by brewers for extracting beer from malt.

The inventor places the flax-straw in a vat or vessel like a brewer's mash tub, which has in it a coil of steam pipe, and covers the straw with hot water not exceeding the temperature of 105° of Fahrenheit. He then covers over the vat and allows the straw to steep for some time, during which time the straw is agitated or stirred about, and the temperature is kept up to 105°, or rather more. After some time the temperature is increased either by passing steam through the coil of pipe, or by adding water of a higher temperature, so as to increase the heat of the water gradually up to about 120°, and then subsequently up to 200 . After some hours the liquor is drawn off, and similar processes performed. The flax is subsequently dried and scutched in the usual manner.

Joseph Adamson, of Leeds, York, engineer. *Improvements in flushing apparatus and in water-closets.* Patent dated April 14, 1853. (No. 904.)

Claims.—1. The employment of a moveable balanced cistern for effecting the periodical flushing of drains, water-closets, urinals, or sewers, in conjunction with a syphon, as described.

2. A mode of constructing water-closet

basins, whereby they constitute in themselves the flushing apparatus, such basins being made either with or without syphons, as described.

JOHN WALLACE DUNCAN, of Grove End-road, St. John's-wood. *Certain new combinations of gutta percha with other material, and the method of applying such for use.* Patent dated April 14, 1853. (No. 906.)

This invention consists in the manufacture of adhesive waterproof cement of gutta percha, and other matters.

For uniting very thin sheet gutta percha or gum mudder to silk, or other fine fabrics, the inventor prepares his cement in the following proportions: — 40 lbs. of gutta percha, 3 parts caoutchouc, 3 parts shellac, 14 parts Canada balsam, or Venice turpentine, 35 parts of balsam from the liquid amber styrac flua or styrax, 4 parts of gum mastic, and 1 part oxide of lead. He compounds a cement suitable for uniting sheet percha to leather, as for shoe soles of 50lbs., of gutta percha 40 parts, of Venice turpentine 4 parts of shellac, 1 part of caoutchouc, and 5 parts of the styrax before mentioned. The inventor also describes other similar cements for various purposes.

CHARLES GREEN and JAMES NEWMAN, of Birmingham. *Improvements in the manufacture of wheels.* Patent dated April 14, 1853. (No. 908.)

This invention consists of rolling iron into plates, each plate leaving at one edge a suitable section for forming the tyre, the other portions of the tyre forming the spokes or disc and central parts of the wheel. In using the plates, portions are cut out either so as to leave spaces between the spokes, or that the parts may come together and form a close disc or wheel. The inventors claim the above method of forming wheels.

ROBERT WYBURN, of East-street, Taunton, Somerset. *Improvements in the construction of easy chairs.* Patent dated April 14, 1853. (No. 909.)

The inventor describes and claims a combination of parts forming an easy chair and a reading-desk, which latter is attached to one arm, and also forms an invalid's table. The seat of the chair consists of a frame crossed with wooden strips, the side-rails being cut crooked and continued to form back legs, and to this frame strong arms are fastened. The back of the chair is a separate piece of framework attached to the seat by means of thumb-screws, and so arranged that it may be fixed at any degree of inclination.

WILLIAM OGDEN, of Oldham, Lancaster, manufacturer. *A certain improvement or improvements applicable to carding-engines used for carding cotton, wool, and other fibrous materials.* Patent dated April 14, 1853. (No. 910.)

This invention consists in the arrangement of certain apparatus by which a current of air is caused to circulate over the working surface of the carding-engine, so as to carry off the fly, or small waste, floating in the atmosphere of the card-room.

DAVID ZENNER, of the Borough and county of Newcastle-upon-Tyne. chemist. *Improvements in the treatment of ores and other substances containing metals, to obtain products therefrom, and the apparatus used therein.* Patent dated April 14, 1853. (No. 912.)

Claims.—1. The employment in retort-furnaces of an upright conical or pyramidal retort, heated on the outside by means of flues, and the application of this retort-furnace to metallurgical and other chemical operations.

2. The manufacture of green copperas, or other salts of iron, by dissolving protosulphuret of iron, as described.

3. The concentration and separation of precious or valuable metals obtained in, or combined with pyritical ores, or protosulphuret of iron, as described.

4. The method of precipitation and separation of precious metals from non-sulphurised ores or matters, and from solutions, by means of protosulphuret of iron, or hydrated protosulphuret of iron.

5. The use of protosulphuret of iron instead of metallic iron, in the manufacture of copperas.

ALEXANDER CRICHTON, of St. George's-terrace, Park-road, Liverpool, Lancaster, engineer. *Improvements in the fittings of bilge-pumps and injection-cocks of iron steamers and sailing vessels.* Patent dated April 14, 1853. (No. 913.)

Claim.—The mode of constructing and applying perforated drains communicating with several spaces between the frames and floors; and, also, an apparatus for cleaning them.

FRANCOIS MARIE ANTOINE SERRUYS, of Brussels, Belgium. *Improvements in tanning.* (A communication) Patent dated April 14, 1853. (No. 914.)

This invention consists in immersing the skins or hides, after the hair is removed, in a solution of mimosa catechu, and subjecting them to manipulation, then immersing them in a solution of vitriol, and finally in water. The patentee claims the application of the above-named substances to the tanning of skins and hides.

JEAN BAPTISTE MANIQUET, manufacturer, of Paris, France. *Certain improvements in machinery or apparatus for winding, cleaning, doubling, and spinning silk, cotton,*

wool, flax, hemp, and other filamentous materials. Patent dated April 14, 1853. (No. 915.)

Claims.—1. An arrangement of apparatus for giving motion to the reel or swift, as well as to the bobbins.

2. An arrangement of apparatus for causing the lower end of spindles employed in winding, doubling, twisting, or spinning fibres to turn in vessels or cups containing oil.

3. The placing revolving nipping-surfaces on the spindles employed for twisting and doubling fibres.

GEORGE TITTERTON, of Margaret-street, Cavendish-square, Middlesex. *Improvements in brushes.* Patent dated April 14, 1853. (No. 916.)

Claim.—The pointing of the ends of the bristles, whalebone, or other materials employed in the manufacture of brushes, for the purpose of enabling such parts to penetrate readily into the substances to be brushed.

COMPLETE SPECIFICATIONS FILED WITH APPLICATIONS.

JAMES BALDWIN, of Birmingham, Warwick, paper manufacturer. *Improvements in the making of paper bags.* Filed September 22, 1853. (No. 2190.)

This invention consists in a certain method of pasting the parts of paper bags, and then putting them together round a plug formed according to the size intended to be given to the bag.

CHARLES FREDERICK STANSBURY, of Cornhill, London. *A new and useful method of converting fine coal into solid lumps.* Filed September 26, 1853. (No. 2209.)

This invention consists in putting fine coal into strong moulds, and there subjecting it to great pressure, by which it will be forced into a solid mass of greater specific gravity than coal in its natural state.

NICHOLAS CALLAN, of the Roman Catholic College, Maynooth, Kildare, Ireland. *A new mode of protecting iron of every kind against the action of the weather; of rain, river, spring, and sea-water, so that iron thus protected may be used for roofing, for cisterns, pipes, gutters, window-frames, telegraph-wires, for marine, and various other purposes.* Filed September 27, 1853. (No. 2215.)

The inventor proposes, first, to tin the surface of the iron to be coated in the ordinary way, and then to plunge it into a bath of melted lead, or melted lead and tin, and keep it there until the tin already upon the iron combines with the lead or with the alloy.

Claim.—The coating of iron of any kind with an alloy of lead and tin, "in which alloy the quantity of lead compared with that of tin is neither very great nor very small," as a means of protecting iron.

JEREMIAH ILIFFE and JAMES NEWMAN, of Birmingham, Warwick, manufacturers, and HENRY JENKINS, of the same place, die-sinker. *Improvements in the manufacture of buttons.* Filed September 29, 1853. (No. 2230.)

These improvements consist,—1. In manufacturing covered, ball, flower, and drop buttons of various forms. These are produced as follows:—Having cut out a blank of a quatre-foil shape, the inventors put it into a receiving die, by which a flange, or raised edge, is struck up, and may then be gilt or silvered, the silk, mohair, or other covering being also cut out to the requisite form and placed in the shell. The whole is then removed to a second receiving die, and by means of pressure the flange is doubled down on the covering, which is thereby secured to the shell; the leaves are then bent back between dies, according to the form to be given to it. 2. In the manufacture of a covered button having any ornamental or irregular outline. To produce these suitably shaped dies and moulds are employed, having outlines corresponding to that required; metal blanks are then struck out, covered, and made up. 3. In producing sunken or intaglio devices upon the shell or surface of buttons. In the production of these, metal shells, perforated by suitable dies, are used, and also moulds having projections exactly corresponding to the perforations. The covering material is then placed in these moulds and forced through the perforations in the shell, the covered shell is then removed, and the button made up in the ordinary way.

CALEB BLOOMER, of Gold's-hill, West Bromwich, Stafford, manufacturer. *Improvements in the manufacture of anchors.* Filed October 1, 1853 (No. 2241.)

This invention consists of a new method of manufacturing the horns and palms of anchors, in which the connection between those parts is maintained by means of rivets.

NICHOLAS CALLAN, of the Roman Catholic College, Maynooth, Kildare, Ireland. *A means of protecting iron of every kind against the action of the weather, and of various corroding substances, so that iron thus protected will answer for roofing, cisterns, baths, gutters, pipes, window-frames, telegraphic wires for marine and various other purposes.* Filed October 12, 1853. (No. 2340.)

Claim.—The coating of iron of any kind with an alloy of lead and tin, which alloy contains a moderate but not an exceedingly great quantity of lead compared with that

of tin; or with an alloy of lead, tin, antimony, and zinc, or with an alloy of tin and one or more of the other three.

THEODORE BENOIT, of Warée, Paris, France. *Certain improvements in apparatus for measuring the pressure of air, steam, gas, and liquids.* Filed October 13, 1853. (No. 2363.)

This apparatus consists of a plate having a circular eccentric groove, to receive the rim of a copper cap which is fixed into it. The surface of the cap is slightly convex, and the edge rounded, so that when the vacuum is made in the interior the convex and circular parts in the circumference of the cap cause a greater displacement. Under the centre of the cap is placed a spiral spring connected with an arrangement of wheels and a pulley, by which the least movement of the cap, caused by the changes of atmospheric pressure, is made to deflect a needle or indicator.

AUGUSTE EDOUARD LORADOUX BELLFORD, of Holborn, London. *Certain improvements in the treatment of copper ores.* (A communication.) Filed October 15, 1853. (No. 2380.)

The patentee describes and claims the following processes:

1. The calcined ore is washed with water in vats of masonry, lined with wood or lead, to avoid infiltration, and placed at different heights, in order that the liquid which they receive may pass from the first to the other vats by means of cocks, the material being kept agitated until the whole of the salts of copper formed by calcination are dissolved. The wash is then run into spare vats, and left to clarify. 2. The wash is concentrated in leaden evaporating vessels, and powdered vegetable charcoal is added, the mixture forming a paste which may be made into bars. 3. The bars or bricks made of the paste are then baked in pottery ovens, which deprives them of all sulphuric acid by the time the bars or bricks turn to a deep violet colour. 4. The bars or bricks are then melted and passed to a reverberatory furnace, to be formed into ingots.

CHARLES JOSEPH LOUIS CLOUX, jun., of France. *A process for the preparation of hemp after the stripping.* Filed October 15, 1853. (No. 2381.)

According to this invention, after being stripped, the hemp is weighed and put into a vat or tub, with water sufficient to immerse it; "the water is then heated at a low temperature, say 15 or 20 degrees." It remains in this state for 10, 12, or 15 hours, according to the nature of the hemp. The water is then drawn off, and replaced by other water, containing about two pounds of salt of soda, and the same weight of green soap, "in the proportion of about two per cent. of the weight of hemp." The temperature is then to be raised to about 100 degrees, for four or five hours, or it may be boiled during the said time. The hemp is then dried in the open air, in the shade, or in a stove at a low temperature; taking care in the last case to have the air renovated from time to time. When the hemp is dry, it is passed between cylinders or rollers finely grooved, whereby it acquires the softness of flax without losing any of its original strength. By this process, from a given quantity of hemp a greater quantity of material suitable for spinning is produced than by the ordinary process.

Claim.—"A system for the preparation of hemp, so that it can be spun in the same manner as flax, obtaining threads of all numbers and of great strength.

ANTOINE CORVI, organ-builder, of Paris, France. *Improvements to stationary and portable organs with keys and cylinder.* Filed October 15, 1853. (No. 2385.)

This invention consists — 1. In a new arrangement of reeds, and entry of air into the pipes of organs, by which the tones and qualities of the sounds produced with the flute, hautboy, and flageolet may be obtained from organs of all dimensions, and which may be played by means of a row of keys, or by a cylinder furnished with points. 2. In a mechanical arrangement, whereby the air played by the instrument is always indicated by a needle upon an index. 3. In the addition to organs of the sounds of castanets, which may be suppressed at will. 4. In the addition to organs of a new kind of triangle. 5. In a new arrangement of the parts of organs.

PROVISIONAL PROTECTIONS.

Dated July 11, 1853.

1651. Felix Lieven Bauwens, of Pimlico, Middlesex, manufacturer. Improvements in the manufacture of candles.

Dated August 2, 1853.

1807. Mead Terry Raymond, of Clement's-lane, Lombard-street, London, general commission agent. Improvements in apparatus for retarding and stopping trains of carriages on railways.

Dated September 28, 1853.

2219. Moses Poole, of Avenue-road, Regent's-park, Middlesex, Esq. Improvements in the manufacture of pulp for paper-makers. A communication.

2221. John Barsham, of Kingston-upon-Thames, Surrey. Improvements in the manufacture of bricks, tiles, and blocks.

2223. William Hickson, of Carlisle, Cumberland, gentleman. Improvements in machinery for the manufacture and packing of bread or biscuits.

2225. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery for cutting metal or other substances. A communication.

2227. Jean Alexandre Labat, junior, of Bordeaux, France. An improved system of stoppering vessels and bottles.

Dated September 29, 1853.

2229. John Phillips, of Birmingham, Warwick, manufacturer. Improvements in shaping metals.
2231. François Julien Raux, engineer, of Montmartre, France. Improvements in railway brakes.
2232. James Griffiths, of Wolverhampton, Stafford, engineer. Certain improvements in steam engines.
2233. Thomas William Kennard, of Duke-street, Adelphi, Middlesex, civil engineer. Improvements in constructing piers and foundations under water.
2234. Hiram Berdan, of New York, United States of America, but now of Cornhill, London. A machine for collecting, preserving, and thereby preventing the loss of mercury, in the process of amalgamating metals, and for the more perfect and economical washing, separating, and amalgamating of auriferous and other ores.

Dated September 30, 1853.

2235. Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, and Rue de l'Echiquier, Paris, France. Improvements in treating certain exotic plants for the production of a fibrous substance, known in commerce by the name of vegetable silk. A communication.
2236. James Willis, of Wallingford, Berks, harness-maker. Improvements in gig-harness.
2237. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, and of Glasgow, North Britain, gentleman. Improvements in apparatus for throwing out ropes or lines, for the better preservation of life and property. A communication from M. D'Houdetot, of Havre, France, Receiver-general of Finance.
2239, Robert Brisco, of Low Mill House, Saint Bees, Cumberland, Esq., and Peter Swires Horsman, of St. John's Beckermet, in the same county, gentleman. Certain improvements in machinery for heckling flax, hemp, China grass, and other fibrous substances.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," October 14th*, 1853.)

1177. Julian Bernard and Edward Taylor Bellhouse. Improvements in pressing and in extracting fluids.
1188. John Knowles and Edward Taylor Bellhouse. Certain improvements in the manufacture of articles of marble.
1201. Peter Armand Lecomte de Fontainemoreau. Certain improvements in steam engines. A communication.
1202. Peter Armand Lecomte de Fontainemoreau. Certain improvements in steam boilers. A communication.

(*From the "London Gazette," October 18th*, 1853.)

1206. Jean Jacques Joseph Jamin and Alexander Symons. Certain improvements in the manufacture of boots and shoes.
1215. John Lee Stevens. Improvements in grates and stoves.
1227. John Ryan. An apparatus for purifying liquids in a ready and economical manner.
1231. George Sant. Improvements in clocks or time-keepers.
1244. William Bolton. Improvements in the treatment and scouring or cleansing of textile fabrics.
1269. John Harcourt Browne. Improvements in apparatus for bottling or supplying vessels with fluids.
1271. Henry Turner. A new mode of applying hydraulic power to windlasses for weighing anchors and lifting heavy weights.
1275. William Babb. Improvements in the manufacture of hair-trimmings.
1276. William Babb. Improvements in the manufacture of hats, caps, and bonnets.
1307. John Lee Stevens. Improvements in furnaces.
1311. Illingworth Butterfield. Improvements in and applicable to looms for weaving.
1341. Alfred Hardwick. Improvements in propelling vessels.
1369. James Hayes. Improved machinery for raising and stacking straw, hay, corn, and other agricultural produce.
1375. John Chisholm. Improvements in the production or manufacture of artificial manures.
1513. Pacifique Grimaud. A new aërogaseous drink, which he calls "Grimaudine."
1525. Charles Topham. Improvements in apparatus for measuring liquids, gases, and other elastic fluids, and for regulating the flow thereof, which apparatus may also be applied to the obtaining of motive power.
1629. Jacob Brett. Improvements in photography. A communication.
1651. Felix Lieven Bauwens. Improvements in the manufacture of candles.
2050. John Kerfoot. Improvements in machinery for spinning cotton or other fibrous substances.
2077. James Martin. Improvements in locks.
2094. Edmund Leyland. Improvements in apparatus for the manufacture of sulphuric acid.
2095. Thomas William Gilbert. Improvements in sewing sails and other articles.
2099. John Webster. Improvements in the treatment of fatty ond oily matters, to render them suitable for the manufacture of candles.
2170. Edward Thomas. An improvement in the construction of looms for weaving.
2208. James Smith. Improvements in scythes.
2219. Moses Poole. Improvements in the manufacture of pulp for paper-makers. A communication.
2229. John Phillips. Improvements in shaping metals.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed October 14, 1853.

899. Constant Jouffroy Duméry.
914. François Marie Antoine Serruys.
916. George Titterton.
918. William Allen and William Murrell.
920. William Edward Newton.
949. Andrew Blair.

Sealed October 20, 1853.

950. John Smethurst.

951. Samuel Weight.
952. Emile Chappuis, fils.
953. Henry M'Evoy.
960. Charles Reeves, junior.
964. Philip Harris.
965. William Robjohn.
976. Edward Onslow Aston and George Germaine.
986. Richard Johnson.
987. Edward O'Connell.
989. Charles Léon Desbordes.
990. John Chatterton.
993. James Emery.
995. Julian Bernard.
1006. Frederick George Underhay.
1031. James Berry and Thomas Booth.
1033. William Hurt Sitwell.
1034. Sir John Scott Lillie.
1043. Jacques Stanislas Vigoureux.
1064. François Monfrant.
1135. John Fisher.
1149. George Roberton and Alexander Roberton.
1187. Edward Taylor Bellhouse.
1245. Charles De Bergue.
1293. Charles Cowper.
1351. John Robert Johnson.
1359. William Boyd.
1519. Juste Giret.
1623. John Knox Stuart.
1773. Theodore Dethier.
1885. Richard Archibald Brooman.
1901. John Gwynne and James Egleson Anderson Gwynne.
1927. George Leedham Fuller.
1947. Robert Moore Sievier.
1955. Frederick Osbourn.
1959. James Webster.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

NOTICE TO CORRESPONDENTS.

G. F. Goble.—Your communication came too late for insertion in the present Number.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1577.] SATURDAY, OCTOBER 29, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

CRADLE REAPING AND GATHERING-MACHINE.

Fig. 1.

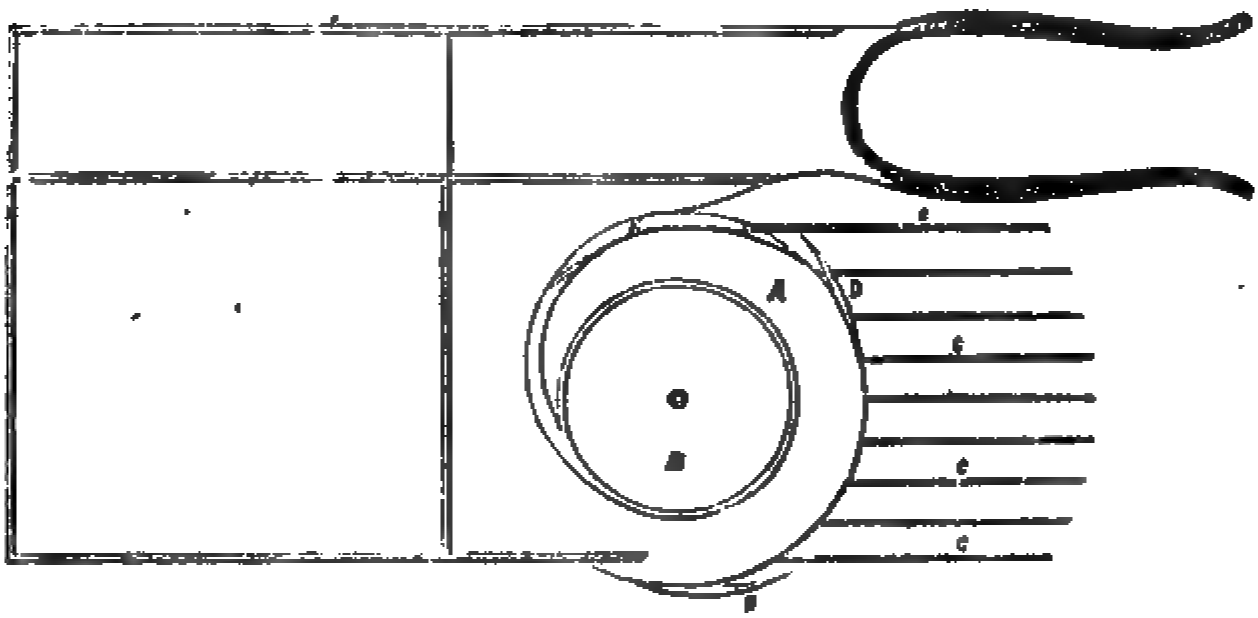


Fig. 2.

CRADLE REAPING AND GATHERING MACHINE.

(Patent dated April 30, 1853, as a communication to Mr. R. A. Brooman.)

THE nature of this invention consists in the adaptation of the common grain cradles to machinery. The apparatus, constructed according to the invention, consists of a cart (the two wheels of which are the motors of the machinery) having the cradling apparatus, or cutting and gathering apparatus, attached. On the axle, between the motor-wheels, is a bevil cog-wheel, which is in gear with a bevil pinion on a shaft under the machinery and lying longitudinally with the cart body. This shaft drives, by means of bevil gear, the rotating-cradles; the "cradles" being the cutting and gathering-apparatus. On the bottom of the circle are scythes or knives, which cut the grain in the revolution of the wheel or cradle; and to gather the grain there are curved fingers, as in the ordinary hand-cradle, which convey what is cut to the inside, where a man stands ready to throw it out to the rear-part of the cart; where it can be bound, and either thrown out on to the ground or conveyed to the outskirts of the field.

Fig. 1 of the engravings hereunto annexed, is a plan of the whole machine, looking down upon the top; fig. 2, a side elevation of the same; fig. 3, a plan of the bottom showing the gearing; fig. 4, the cutting-disc, with the knives, &c.; fig. 5, an elevation of the cutting-disc and fingers; and fig. 6, a section showing its gearing.

The cart-wheels, which are the motors, may be made like ordinary cart-wheels, except that they should have broad tires. They should be about four feet in diameter, and may be placed under the body of the machine, as represented, or outside like the arrangements in ordinary vehicles. The latter is thought the better plan. The axles must be permanently set in the hub or nave of the wheels, as in railway-trucks. Upon the axle of the wheels is a bevil cog-wheel, into which gears a pinion upon a shaft, F, lying longitudinally beneath the body of the machine; on the forward end of this shaft is another bevil cog-wheel, which drives the cutting-apparatus,—see fig. 8, where, H, is a circular disc, beneath which is a bevil-pinion, P, gearing into the pinion, Q, on the horizontal shaft, F. The stem or pivot, O, fig. 8, on which the cutting-apparatus revolves, is secured to the bar, S, running across the body of the machine beneath. The pinion, P, is permanently secured to the under side of the disc, and is made to revolve with it upon the stem, O. On the top of this permanent stem is set firmly the central platform, B, fig. 5, upon which the man stands who is to throw out the grain when cut for the binders. Around the edge of the disc, H, is the cutting-rim, K, upon which are fastened the knives or scythes, D. The "cradler" (that is, the apparatus composed of the fingers, L, and the guards, M, upon which they are placed,) is constructed upon the disc, H (figs. 4 and 7). The guards M, are segments of cylinders set on end upon the disc, H, two, three, or four of them. Upon these are secured the fingers, L, which extend from the guards out to the outer side of the rim, and then curve in the same manner as the scythe or knife. The scythe and fingers, in their general arrangement, constitute an ordinary cradle or apparatus for cutting grain. The edge of the rim, K, is made sharp, so that if the knives fail to cut the grain the edge of the disc will do it. The spiral guides, A, (figs. 1 and 2,) are for conveying the grain when cut through the channel of the spiral to the centre. By the motion of the scythes the grain is cut, and the fingers force the grain into the spiral channel, the buts of the grain rest upon the rim, K, until the grain is deposited in the centre. These guides may be made of strips of wood bent round to the proper shape, or of iron. They can be steadied or braced in their position by standards of iron (if carried high enough to let the grain pass under), connected with the body of the vehicle near the pole or shafts. The entire platform, should it require steadying, may be braced in the same way.

The elevators, C, are for lifting up the grain when lodged. They are shaped in front like sledge-runners, and will generally rest on the ground, to govern the height that the

grain should be cut. The elevators are few or many, as may be desired: a dozen would be enough. They are thin strips, fastened beneath the forward part of the machine, and set edge up; their purpose is also to prevent the knives striking upon stones or roots; and it

Fig. 5.

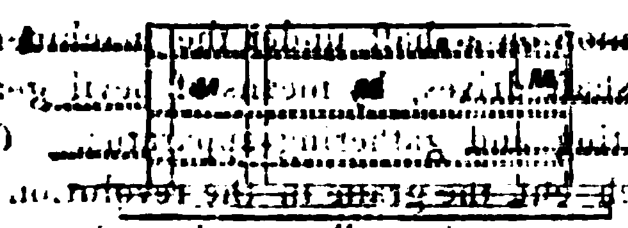


Fig. 4.

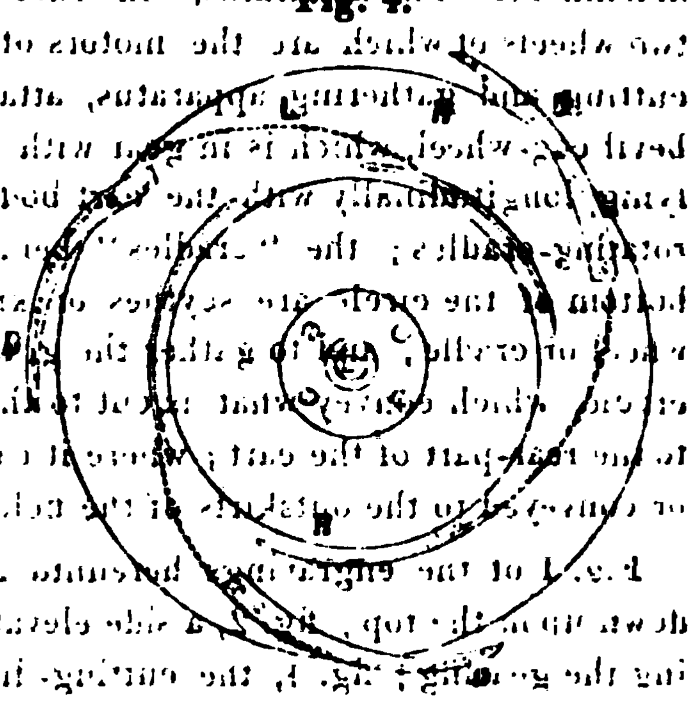
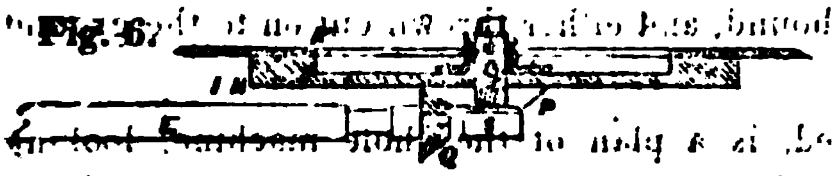


Fig. 6.



is evident that the grain may be cut at any desired height from the ground, by the relative positions of the shafts and the body, which may be varied at pleasure.

EMIGRATION.

PARTICULAR and popular opinions upon the subject of Emigration have been considerably modified by the unexampled discoveries that have lately been made in California and Australia. The sagacity of even modern political economists seems not ever to have led them to contemplate the disclosures of such amazing sources of wealth, or the probable consequences of such disclosures. Indeed, not a few of our writers upon political philosophy seem to have thought it exceedingly improbable that foreign or colonial enticements could ever so abound, or become so powerful as to excite men to a spontaneous and extensive system of emigration from their native land. Less than seventy years ago Paley wrote thus:—"Lastly; men may be tempted to change their situation by the allurement of a better climate, of a more refined or luxurious manner of living; by the prospect of wealth; or, sometimes, by the mere nominal advantage of higher wages and prices. This class of emigrants, with whom alone the laws can interfere with effect, *will never, I think, be numerous*. With the generality of a people, the attachment of mankind to their homes and country, the irksomeness of seeing new habitations, and of living amongst strangers, will outweigh, so long as men possess the necessaries of life in safety, or at least so long as they can obtain a provision for that mode of subsistence which the class of citizens to which they belong enjoy, all the inducements that the advantages of a foreign land can offer." The contradiction to many of these sentiments was sufficiently proclaimed when the artizans of Europe were seen swarming by a thousand wild and perilous routes to the mines and placers of San Francisco; and has been subsequently affirmed as shipload after shipload of British mechanics have passed away from our coasts to gather gold from the soils of New South Wales and Victoria. It can no longer be said that the "prospect of wealth" will not allure many from their homes and country, now that California has charmed away its thousands and Australia its tens of thousands. It was natural enough for a philosopher of nearly a century ago to calculate largely upon the attachment of our countrymen to their native land, when they were but little attracted from it, and guaranteed but little security out of it. He, however, who undertakes

the task of remodelling our philosophy, must not forget to estimate duly the discoveries that have so much relaxed the hold of Briton upon her populations. He must remember that gold-fields invite the people across the seas, and *steam*ships lie ready to take them. Our great antipodal colony is offering the richest bribes to such as will abandon Old England; and all things teach us that we are not far from the period when Englishmen, sitting in their Australian cottages, will forget that they are separated from their native soil by the earth's diameter, and will sing

"There's no place like home,"

as cheerily as ever they sang it in the gone good old times! To such issues are modern events and improved sciences swiftly leading us.

The subject is a tempting one. Every moment spent in consideration of it reveals some new features, and such too as come properly within the scope of scientific men. How easily we slide into reflections on the probable effects of these discoveries upon the value of capital; upon our arts and manufactures; our imports and exports; our demands for other foreign gold—as, for instance, that obtained from the Ural Mountains; upon the augmentation of British power, if British statesmen are wise; upon the distribution and increase of the Anglo-Saxon race and language; and upon a hundred other matters of equal interest and moment!

But we resist the enticement of these topics, at least for the present, and shall restrict ourselves to one subject,—namely, the present evil system of emigration, which is vastly reducing the number of our artizans and leaving our paupers as numerous as ever; which is thinning our factories and workshops, while our Unions and the haunts of vagrants are, so far as this mode of relief is concerned, as plethorically full as ever.

Whatever may be thought to the contrary, the possession of a vast colony like Australia, of a genial and salubrious climate, and of a richly productive soil, into which she can pour her excess of population, and so peaceably extend her empire almost indefinitely, should be an incalculable blessing to England—and would, if the advantages thus afforded were not despised.* Surely, starvation and beggary need not long exist in a land so highly favoured! And yet we have daily and hourly proofs that they do exist,—and moreover, that they restrain and keep down to no small extent the active energies of the nation. There, yonder, lies Australia, broad and inviting; and here wander, and suffer, our hungry superfluous populations! And why?—Simply, first, because they cannot walk across seas; and, second, because neither the Government nor capitalists will take the trouble of transporting them. In short, because we want said to our paupers and vagrants what Mr. Carlyle's improved Prime-Minister said to "the able-bodied Lackalls," namely, "In the three Kingdoms, or in the forty Colonies, depend upon it, you shall be led to your work!"

But this sustentation of pauperism and vagrancy at home is not the only evil that we are now undergoing. Our readers will remember that, long since, their attention was directed in our columns to the extensive emigration of our superior mechanics to the gold-fields of Australia—(See *Mech. Mag.*, vol. lvii. p. 26.) And this has gone on subsequently, and still goes on, to an enormous extent. So that at this moment the industrial classes of England are hurrying away from her shipyards and her factories, her farms and her fields, her looms and ploughs, to join in the great colonial scramble; while, on the other hand, the beggars are still at our doors, and a host of paupers are still lounging and complaining in our Unions, or are huddled in the dismal hovels such as out-door British paupers alone know how to maintain an existence in. It is true that we have been promised a reduction of these classes by the revisitation of the cholera,

* In this view we omit altogether the auriferous opulence of New Holland, since it is not by this that the real and enduring interests of the mother country will be conserved; but by the fertility of its pastures, its agricultural capabilities, and its wondrous facilities for the development of manufacturing enterprise.

which has again journeyed across the continent to us. But the promise is a rather ghastly and terrible one! Of these two, Australia and cholera, which are now bidding for our populace, we have no hesitation in professing our decided disposition to serve the former, and to defeat, if possible, the latter. Doubtless all men, even our parliamentary and municipal functionaries, would heartily join us in this our profession. And yet when we seriously ask which has received the most aid from our Parliament and our civic corporations, we cannot help feeling that the cholera, and not emigration, has been the more favoured.* And who that has any moderate knowledge of public affairs can arrive at a different conclusion? As students and cultivators of science, we are not to be blinded by the little fits of industry that have seized our public corporations since the cholera has stepped again upon our island, and terrified them into activity! Scientific men know,—and even members of parliament, and mayors, and aldermen might also know, for the smallest possible outlay of cash, and the least possible exercise of thought,—that every accumulation of filth, every undrained street or alley, is a public and an earnest, aye, and a perpetual invitation even to the cholera itself, as well as to diarrhœa, and ague, and the whole family of fevers. We desire to speak plainly on this matter. Men are anxious enough to rid themselves of so alarming a visitor as that of which we are writing, after it has made its descent upon them. But why, in the name of reason, do they not manifest some anxiety to keep it away when it is far from them?—which would be both more rational and more hopeful than first to attract it to them, and then to make confused attempts to stay its ravages, and to effect its expulsion.

Further; public prayers are little better than blasphemy, when directed against an object which they who pray have virtually encouraged,—unless indeed they be the accompaniments of repentant effusions. And yet the corporations of England, who have been content to dwell in filthy towns and uncleansed cities, have not forborne to assemble in their churches to implore the saving interposition of Providence in the present pestilential visitation. Let them pray who have before laboured diligently, and their prayers will at least be regarded; but the idle, and they who hinder healthful improvements, had better hold their peace. Let us not be misunderstood in all this. If science has made known the causes and encouragements of cholera, and thereby the modes of avoiding it, we think it will be granted that we do but utter the teaching of the purest and most intelligent Christianity when we say that they are criminal who take no part in carrying out the measures thus suggested for the prevention of the disease. We think few will be bold enough to take exception to such a sentiment; we shall not therefore trouble ourselves at present to enforce it at greater length.

Before quitting this point, however, we would observe, that if any one believes that the cholera comes not as the result of simply natural causes, but rather as a special affliction of Providence, sent as a retribution for some national but undiscovered crime, we request that individual to study the route by which the disease approached us; to inquire into the conditions of those continental cities through which it passed; and chiefly to explore those towns of our own country in which it has proved most destructive, and especially the immediate localities in which its victims have been most numerous, then draw his conclusions from the facts thus made known to him,—and we think he will discover, by the simplest deductions possible, that cholera is not superior to, or independent of, natural laws; that as it may be cherished, so also it may be avoided; that it comes only to uncleanness, and luxuriates only in corruption.

* In forming this opinion we, of course, include in our view the aids arising both from the *acts* and the *omissions* of the Parliament and the civic councils. It seems quite unnecessary to attempt here to show that he who neglects a duty is as obnoxious to blame as he who perpetrates a crime. If our theologians have not enforced the knowledge of this fact, and convinced us all of the equivalence of "sins of omission" and "sins of commission," we think they cannot yet have advanced far in the improvement of public morality.

If we now turn again to the subject of Emigration, we shall require to spend but little time in estimating the assistance it has received from those who have certainly promoted the pestilence. Truly a few ill-fitted Government ships have been provided, and a few parishes have undoubtedly been active in assisting their poor to emigrate. But the examples of such things are few, and not always such, in detail, as one can approve. And yet, we repeat, there lies Australia broad as twenty Englands; around us lie the vessels that would carry the legions of our poor in safety to it. Notwithstanding, here are the poor still about us numerous, miserable, suffering! We know a good-hearted man who thinks it a sad fact that our poor fellow-countrymen are not all better informed as to "the extent, and beauty, and fertility of our great southern island, which one might almost call a continent." But of what possible value could the knowledge be to them? Some *philanthropic* men might indeed find it an interesting employment to tell their starving fellows of a land flowing with milk and honey, lying far off in the seas; but to us it would be rather a painful and vexatious occupation. One might as well, nay better (less offensively, we should think), offer to the shivering the hymns and odes of "burning Sappho," or Mr. Tennyson's "Palace of Art" to the houseless. Men who are wrung and tortured by *need*, are not the proper persons to refer to such purely imaginative pleasures as that to be derived from the mental contemplation of an inaccessible land of plenty on the other side of the world. The English generally are not a highly imaginative people; but a hungry Englishman is the last being in creation that we should refer to poetic satisfactions. No, somehow or other, the means of conveying the poor of our country to New Holland must be found, and put into operation. England must disburden herself of her non-producing consumers. Union-masters must be sent on a long vacation; the operative classes must be disencumbered of the monstrous load of pauperism; and the "able-bodied" poor must be sent to dig, and plough, and plant, and rear crops, and build buildings, and found factories, and erect institutions from end to end of that colony of ours, that we trust will one day be as glorious as it now is *great*.

There are, it is true, some people who are indisposed to a cheap and extensive system of emigration, by which the poor of our land would be freely spread through our colonial possessions. These persons are afflicted with a fear that the earth will become over-populated; and imagine then a crisis which they cannot look upon without pain. It is of course as certain that prosperity increases population as that poverty retards its growth. But over-population,—an evil not often occurring to nations,—is one that certainly need not be looked upon as likely to afflict the earth. Strong and ingenious arguments have been not unfrequently adduced to show that such an event is not possible. This is certainly not the place either to revive these, or to suggest such additional ones as appear to us to be cogent. We may at least say, that no very near relations of ours will ever be pushed off the planet for want of room—probably none who will be nearer and dearer to us than we are to Noah, who doubtless concerns himself about us in a very general way. We say, therefore, no impediment should be placed in the way of our emigrants on this ground.

Others fear that a corrupt and degenerate nation would be upbuilt by making the lowest classes of our own land its founders. But then we cannot transplant landed aristocracies like ours; and probably if we could, they would be but indifferent instruments in establishing a new empire. It should be remembered that our aristocracy is one of *inheritors*; they have had a good deal given them by their fathers, and no doubt use their possessions admirably! But it does not follow from this that they could found states wisely and securely. No, no! I think since we, who are a great nation, and America, too, which, it is guessed, "*bangs* all others," both proceeded from such an obscure and not very respectable origin, we may venture to dismiss this objection also rather summarily and to hold our faith, that it

were both wise and just to get those superfluous people, as we are obliged to name them, landed and set free upon the shores of Australia, in order that they may work and live. And now we have to ask, can this good object be effected? Or, what is perhaps more our present business, can it ever be forwarded? But the consideration of this we will leave for a future paper.

THEORIES OF LIGHT.

(From the *Scientific American*.)

THERE are in vogue two theories by which the phenomena of light are explained; the one that of Descartes, Huygens, and Euler, commonly called the undulatory theory; the other that of Newton and Brewster, known as the theory of emanations. The former of these we shall proceed to consider.

It is assumed that all space is filled with a subtle and highly elastic element, called ether, which pervades the atmosphere and all transparent bodies, and that light is produced by its vibrations, as sound is caused by the undulations of air. Colours are produced by the different number of vibrations communicated to the ether by the vibrating body. The advocates of this theory maintain that light is in all respects similar to sound, and the colours are compared to the notes of an octave. A luminous body is repeatedly likened, by Euler, to a bell, and he teaches that opaque bodies are rendered visible by their being excited to vibration by the waves generated by a luminary.

Euler urges against the Newtonian hypothesis, that "as the rays of the sun must be everywhere crossing the rays of the stars, their collision must be violent in the extreme." But as he supposes light to be transmitted in wave lines, while Newton supposes it to move in direct lines, why, is not his objection most weighty against himself? Carrying out the parallel with sound, what would be the result if an immense multitude assembled together, were each at the same time to shout with a different cry? Would a listener be able to hear distinctly the voice of any one? Most certainly not; yet gazing among the myriad orbs which spangle the starry vault, the eye can readily single the smallest, whose light is sufficient to affect it, and contemplate it, untroubled by the light of the more powerful luminaries shining in other parts of the heavens.

Euler also objects to Newton's theory, because it does not satisfactorily explain to him the phenomena of colour. He claims that it cannot be that opaque bodies are rendered visible by the light reflected from luminaries, because they appear the same under whatever circumstances they are placed. He supposes that opaque bodies have each a *tone* of their own, and that when their vibrations are excited by a luminary, they are consequently uniform. According to this, a rough steel plate vibrates in harmony with the colour called gray, but when polished it vibrates in harmony with all the colours of the spectrum! Euler perceived the absurdity of this, and acknowledges that in the case of mirrors there is an actual reflection; but he might have spared himself the admission. Take a piece of white paper and cast upon it the solar spectrum. Different parts of this same sheet of white paper are vibrating in harmony with all the colours!

Euler also thinks it inconceivable that a luminary should be able to emit particles moving with the astonishing rapidity of light, but he finds no difficulty in conceiving it to be transmitted by undulations, because of the extreme rarity of ether. He says,—"were the air as rare and elastic as ether, sound would be transmitted with a velocity equal to that of light." Unfortunately for this hypothesis, it has been found that the conducting power of the air increases with its density, while wood and the metals are better conductors of sound than any other matter.

Neither is there any reason, if light be propagated by undulations, why it should always be transmitted in straight lines. Sound can move as readily in a bent tube as in any other. It has been said that light could not pass through an orifice and expand its undulations like sound, on account of the great size of the orifice compared with the extreme minuteness of the rays of light; but this is very unsatisfactory.

The reader will bear in mind that according to this hypothesis, the luminous body is compared to a bell, and light is produced by the undulations excited in the ether by the luminous body, the different colours being caused by a different number of vibrations in a given time. According to this, a luminary emitting white light must at the same instant be vibrating at the different rates which produce all the colours of the spectrum! This is, of course, a palpable absurdity, as great as to suppose a bell capable of vibrating at the same moment in harmony with all the notes of an octave.

The failure of the advocates of this system to explain satisfactorily the refraction of light might also be urged against it, as well as the very unsatisfactory explanation of polarization; but we shall have more to say respecting this in another article, and

we leave the subject to the candid consideration of our readers. We shall now proceed to review the theory of emanations, or the Newtonian theory generally received until the present century, by the English philosophers, but of late fallen in disrepute.

Against the theory of emanations, as taught by Newton, there is one objection, which, though it has been often urged, has never, and can never be answered. Newton taught that light consisted of particles of the matter of the luminous body; if so, the sun must be decreasing in mass, slowly indeed, yet nevertheless constantly, and this process must in time result in utter extinction. It is vain to say that this process is slight; according to the laws of gravitation, there must be an equilibrium between the centripetal forces; and the moment any appreciable quantity of the sun's mass has passed away, the centripetal force would be weakened, and the planets would no longer revolve in the same orbits.

Priestly, casting the concentrated light of the sun upon a delicate balance, attempted to weigh it. He even fancied he had succeeded; and from the data thus obtained, he proceeded to compute the total diminution of the sun's bulk for a period of six thousand years. But we are satisfied that our intelligent readers will, with us, reject his experiment *in toto*, as the smallest particle of dust floating in the air would weigh more than the pretended weight of the sun's rays, as indicated by his balance. And from the most carefully conducted experiments, as well as from theoretical considerations, it is highly improbable that the rays of light are in the smallest degree ponderable. We regard this argument as an unanswerable one against the Newtonian system; it cannot be evaded, and is of itself, we think, sufficient to overthrow it. Nor would this waste of matter be as slight as is pretended. When we consider that every point in space within reach of the sun's rays is, at each instant of time, supplied with light from one-half the luminous points on the sun's surface; inconceivably minute though the particles of light must be, yet their almost infinite number—a number so great as to mock the powers of mathematical calculation—must, if the Newtonian theory were true, *rapidly* diminish the sun's mass. We are not surprised that from these considerations so many philosophers of eminence have of late been disposed to reject the Newtonian theory, and adopt the only other —that of undulations.

Nor is the theory of colours, as explained by Newton, by any means satisfactory. At the time he began his explorations, he entered an untrodden field, and, as a first discoverer, he did more to unfold its beauties than ever has been or can be done by any other; yet the light of modern science has rendered improbable many of his deductions. He supposes a beam of white light to be composed of seven different colours, yet he does not attempt to explain in what the difference of these rays consists; he regards the colours of opaque bodies to be consequent upon the reflection of an unequal proportion of the coloured rays of white light; but he does not tell us what becomes of the remainder. Brewster attempts to help him out of this difficulty by supposing an absorption of the remaining rays; but this is only giving a name to the difficulty, without explaining it; and, besides, what would be the consequence when the opaque body had absorbed to saturation? Sir David has himself shown it unnecessary to suppose the existence of more than three coloured rays in the spectrum; but he does not, any more than Newton, point out the difference between them.

The theory of "fits," if we may call that a theory which is merely giving a partial expression to a recognized fact, is very incomplete. We consider Newton justifiable in supposing that the particles of light are, when in one portion of their path, more easily reflected, and when in another, more easily transmitted; but he does not tell us why this is so.

The failure of the advocates of the theory of emanations to keep pace with modern discoveries in polarized light, is also one cause of the disrepute with which this theory has of late been regarded. The investigations of Brewster, of Biot, of Malus, of Fresnel, and a host of others, have given rise to the discovery of a class of phenomena which, from their variance with previously recognized laws, rendered necessary new hypotheses, or at least new applications of the existing ones; and the majority of these observers, being advocates of the undulatory hypothesis, their explanations, naturally enough, coincided with their previous views; hence it is now generally supposed that this theory is the only one that will satisfactorily explain the phenomena in question.

As we shall hereafter have occasion to differ from the prevalent opinions concerning the polarity of common light, it may not be amiss now to remark, that we cannot discover the evidence on which is founded the assumption of Brewster, that common light is composed of light polarized in two planes situated at right angles to each other. We contend that the fact of the existence of two polarized rays situated in opposite planes, *after* double refraction, is no evidence that they were thus polarized *previous* to double refraction; the same force which,

refracted, may have polarised the rays. Nor do the other modes of polarisation afford any proof of the controverted facts, for a similar reason.

LEWTHWAITE'S BLIND-ROLLERS.

(Patent dated April 15, 1853.)

The improvements which constitute Mr. Lewthwaite's ingenious and very useful invention are represented in figure 1 of the annexed engravings, which is a longitudinal section of a roller, or mounting for a window-blind, having the improvements applied thereto. A is part of the window-frame, or sash-race; B is the blind-roller, composed of wood or metal tubing, and having a groove or recess, C, throughout its length; as separately represented in plan and section in figs. 2, 3, and 4. D is a fixed flanged-collar at one end of the roller, and E another similar collar at the opposite end; the collar, E, has a moveable ring, e, turning freely on it,—a portion of the moveable ring, and of the collar on which it turns being cut away to admit of the introduction of the rod, F, on which the blind is mounted into the groove, C. The rod, F, with the blind on it, having been introduced into the groove, is retained there at one end by bearing against that portion of the collar, D, which overlaps the groove, and at the other end by turning the ring, e, partially round, so as to bring a part of the ring of full width to overlap the groove. The fixed collar, D, carries a disc, d, the edges of which constitute the flange of the collar, and around the centre of this disc is cast, or otherwise fitted, a small cylinder, H, from which projects a short rod, I, having around it a coiled spring, J, which is capable of being compressed within the length of the cylinder. A hollow cap, K, with a bearing, L, by means of which it is fitted in the window-frame or sash-race, is passed over the projecting-rod, I, and brought close up against the end of the cylinder, H, compressing the spring, J, within it, and is secured in this position by rivetting down the end of the rod, I, over a washer at the end of the bearing, L, or by a pin passed through a hole formed in the end of the rod, or by any other convenient means. The sides of the cap, K, should be of such depth as just to come flush with the outer edge of the flanged

Fig. 1.

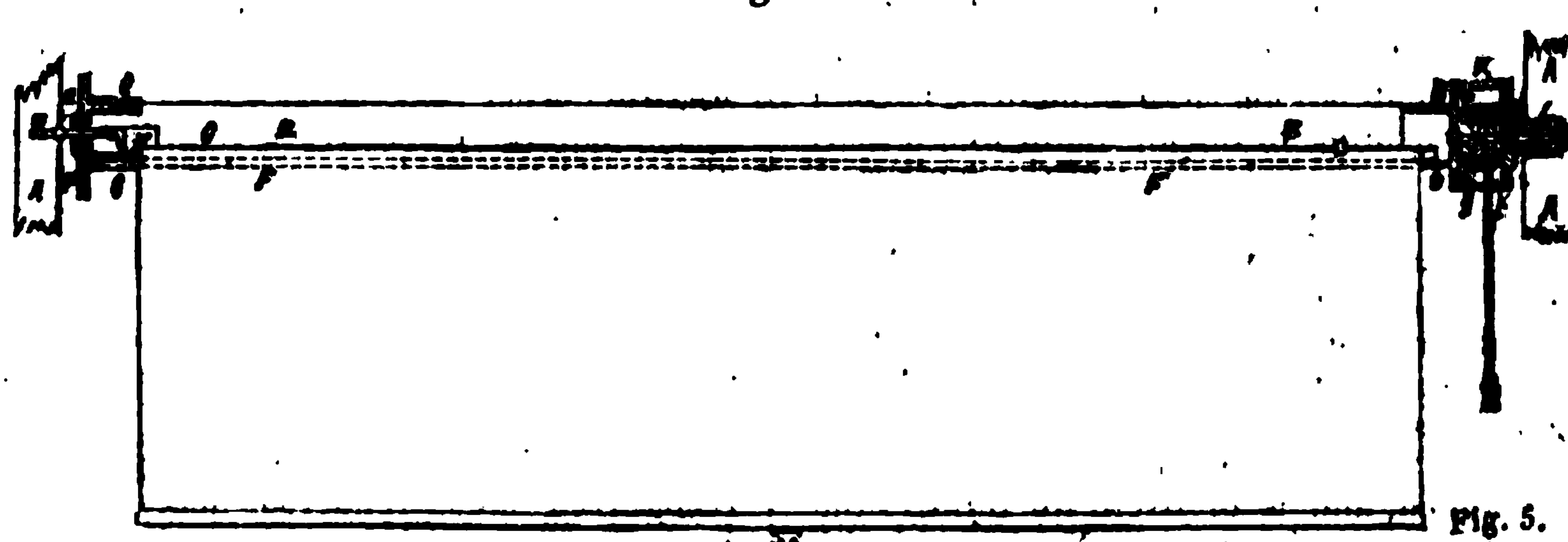


Fig. 5.

Fig. 4.

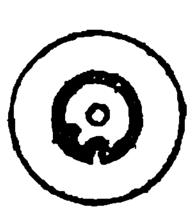
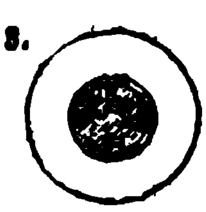


Fig. 3.



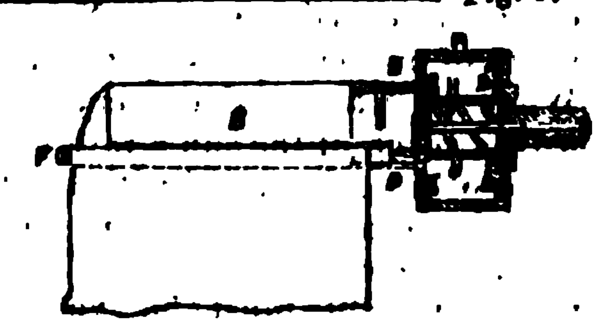
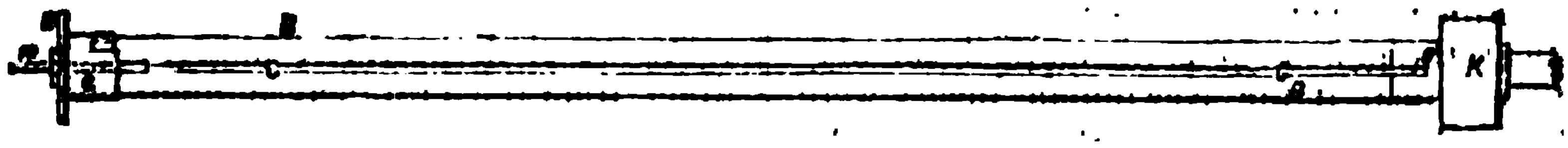


Fig. 2.



portion of the collar, D. A portion of the hollow cap, K, is cut away, as at g, to allow the string for raising the blind to pass through. This string is wound round the cylinder, H, to a sufficient length before fitting in the rod which carries the blind, and the raising of the blind is effected by pulling on the free end of the string, so as to unwind it from the cylinder, and thereby cause the blind-roller to revolve and wind up the blind round it. The blind is retained in any desired position by the pressure of the spring, J, against the inside of the cap, K. The blind and mounting are fixed in the window-frame at one end by the bearing, L, on the hollow cap, K, taking into a square hole or recess cut therein for it, and at the other end by the pin, M, which passes through the centre of the disc of the collar, E, and also takes into a hole or recess cut

in the window-frame. The inner end of the pin, M, is bent down at a right angle, and the end of the blind-rod, F, bearing against this bent part of the pin, prevents it from slipping, and keeps all secure. The collar, D, may be made with an additional flange, D², as shown in the sectional view, fig. 5, for the purpose of preventing the cord by which the blind is raised from rubbing against the cap as it revolves; but as in practice this rubbing produces no appreciable amount of wear, the arrangement first shown and described is preferable. The above arrangements are equally applicable in the case of maps, and other articles which may be required to be mounted on rollers.

RAILWAY SIGNALS.

To the Editor of the Mechanics' Magazine.

SIR,—I herewith inclose a description of my mode of communicating to railway officials, whilst running trains on to stations, &c., trusting, for humanity's sake, you will either approve or condemn its practicability to obviate disasters to railway travellers, &c.

Goble's Self-acting Railway Signals consist of a pendulous flap hanging down in front of the locomotive and guard's carriage, nearly the width of the rails, and as low as may be desirable; the upper part of the flap is connected to rods and cranks communicating to the handle of a whistle, a counterpoise being placed at the other end to shut the plug after being opened by the train passing over any obstacle on the line, either placed there intentionally or permanently fixed near stations, curves, dangers, or what not, when the whistle is going with sound irrespective of official interference, neglect, &c., &c.

I am, Sir, yours, &c.,

G. F. GOBLE.

7, Trinity-street, Borough,
Oct. 20, 1853.

[The method of signalizing described by our correspondent has been found to fail when subjected to experiment, in consequence of the magnitude of the impulsive force produced by the contact of the suspended body with the obstacle. It should be remembered that such an arrangement is often most needed when the advancing train has so enormous velocity, sufficient indeed to shatter completely the apparatus employed in communicating with the whistle. —Ed. M. M.]

PHOTOGRAPHY ON RICE-PAPER.

To the Editor of the Mechanics' Magazine.

SIR,—Having already, by favour of your columns, been enabled to make public some contributions to photography—namely, the application of the double iodide of silver and potassium, and a mode of applying the solutions by means of a glass rod*—perhaps you will further allow me to draw the attention of your scientific readers to the material indicated above, which I have found available in photographic manipulation, in which, as far as I am aware, it has not hitherto been employed.

The substance commercially known as rice-paper is ascertained to be the result of a kind of mechanical lamination on the pith of a marsh-plant (*Æschynomene paludosa*) abounding in India, China, &c. It may be procured in sheets of sufficient dimensions for most camera operations. Its characteristic cellular structure affords the advantage of obtaining a photograph possessing qualities of softness and depth of tone not obtainable on ordinary paper.

The most convenient method of applying the solutions appear to be that of saturation—one surface being finally brought into contact with the sensitive reagent, as in the calotype, &c. Care must be taken not to clog the tissue by excess of the iodide; but this precaution will be needless when operating with simple solutions.

When the rice-paper has received the preliminary treatment, it should be dried under gentle pressure, to preserve its flatness, until the period of exposure. It is best kept in contact with the camera-tablet by means of an interposed film of fluid, in the way already practised. Being a more fragile material than common paper, it need hardly be mentioned that it will require handling with corresponding care.

The appearance of this substance may be changed by subjecting it to pressure sufficient to condense it by destroying its vegetable structure, by which it acquires a whiter hue. This, which is easily effected in a variety of ways, and may be done either before or after the application of the chemicals, or exposure to light, furnishes a means of producing modifications in the photographic picture obtained.

I am, Sir, yours, &c.,

C. J. JORDAN.

October 24, 1853.

* These have been universally adopted, without any reference to myself; and the latter actually illustrated in a photographic pamphlet published by an optician of Cheapside, unaccompanied by the slightest acknowledgment.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

WILLIAM WILKINSON, of Nottingham, framework-knitter. *An improvement or improvements in ropes, cords, lines, twines, and mill-bandings.* Patent dated April 15, 1853. (No. 917.)

This invention consists in the introduction of a metallic wire into the middle or axis of the threads of hemp or other fibrous substance of which the articles enumerated in the title are composed. The inventor prefers the use of iron-wire, but does not limit himself to that; where great flexibility is required he employs copper-wire, and where there is risk of exposure to water, he uses tinned iron-wire, or wire of a metal not readily oxidizable. In forming threads according to his invention, the ordinary method of spinning hemp is adopted, the wire being attached to the wheel or rotating axis at one end, and to a swivel at the other to prevent its twisting.

Claim.—The introduction of a metallic wire, into the threads of which the strands of ropes, cords, lines, twines, and mill-bandings are compressed.

WILLIAM ALLEN, of Westbourne-street, wine-cooper, and WILLIAM MURRELL, of Grosvenor road, whitesmith, both of Pimlico, Middlesex. *Improvements in the mode or modes of cleansing bottles or other similar articles.* Patent dated April 15, 1853. (No. 918.)

This invention consists of a machine for washing bottles, which is composed of an axle worked by a treadle and crank, and which, by means of gearing, gives rotary motion to a vertical axle of a water-tank or receiver. This axle supports a metal frame between the side plates, on which side brushes are fixed. To the central axis is also affixed a wire, carrying a brush for cleaning the interior of the bottom of the bottle, and which is allowed to vibrate sufficiently to cleanse the whole of the lower interior part. Another brush is provided for cleaning the outer side of the bottom of the bottle.

JOHN LEWTHWAITE, of Halifax, York, gentleman. *Improvements in rollers or mountings for blinds, maps, and other like articles.* Patent dated April 15, 1853. (No. 919.)

A full description of this invention is published in a former part of this Number.

WILLIAM EDWARD NEWTON, of Chancery-lane, Middlesex, civil engineer. *Improvements in treating refuse silk waste, and in converting it into a valuable product.* A communication. Patent dated April 15, 1853. (No. 920.)

Claim.—The use of a machine consisting principally of rollers, drums, or cylinders, covered or provided on their surfaces with wire cards for the purpose of operating upon silk waste, and opening or separating the fibres thereof, and converting the waste material into a sliver or sheet preparatory to the after processes of combing and spinning.

SAMUEL BAYLISS, of Old Broad-street, London, Middlesex. *Improvements in consuming or preventing smoke, and heating liquids.* Patent dated April 16, 1853. (No. 922.)

Claims.—1. The intercepting the gases in their passage from the fireplace to the chimney, and dividing them into a number of small streams or bodies, and bringing these in contact with a current or currents of air in such manner as to produce an intimate mixture of air and gases in order to facilitate their chemical union.

2. The application of admixers and heat-retainers, whether employed in conjunction with the inventor's apparatus for preventing smoke, or in furnaces of any other construction.

3. The application of hollow cones (or, more properly, frustums of cones,) open at both ends for facilitating evaporation, and preventing the bottoms of vessels used in heating liquids from being burnt.

JEAN MARIE SOUCHON, of Paris, France, chemist. *Improvements in the manufacture of, and purification of gas for illumination; and certain products therefrom, and in apparatus for that purpose.* Patent dated April 16, 1853. (No. 924.)

Claims.—1. A mode of increasing the quantity of gas, and obtaining cyanides by passing the products of the distillation of coal or other suitable substance through a heated retort containing alkali, or alkaline salts.

2. A mode of obtaining illuminating gas and cyanides by injecting a mixture of tar and ammoniacal liquor into a heated retort, and conveying the vapours or gases so produced through a heated retort containing alkali, or alkaline salts.

3. A mode of purifying gas for illumination, by passing it through a series of revolving purifiers containing purifying liquids and pieces of wood, or other solid matters which are continually becoming wetted with the solutions, and exposed to the gas.

4. The constructing the doors of retorts with catches for fixing them, and hinges with elongated holes or joints for supporting them, as described.

JOSEPH COOKE, of Birmingham, Warwick, gilder, and WILLIAM COOKE, of Birmingham aforesaid, machinist. *New or improved machine for cutting or shaping corks and bungs.* Patent dated April 16, 1853. (No. 925.)

This invention consists in the construction of a machine in which the knife, which is circular, is placed horizontal, and has rotary motion communicated to it by a vertical axis. The cork is fixed in a manner similar to that adopted in ordinary lathes, and has rotary motion communicated to it. When the corks are to be formed cylindrical the rose-spindles which carry the cork are horizontal, but the end of these is capable of being raised when tapering corks are required.

George Albemarle Cator, of Selby, York, gentleman. *Improvements in machinery for preparing flax, hemp, and other vegetable fibrous substances for scutching or other manufacturing purposes.* Patent dated April 16, 1853. (No. 926.)

Claim.—The combination in one machine of the washing, pressing, drying, and breaking processes, or any three of them, which can thereby be carried on simultaneously; the flax or other fibres to be operated upon being conveyed from one part of the machine to the other by mechanical means. Also, the use of upward and downward jets of water, or steam, which may be made to act simultaneously on the upper and under surfaces of the fibres while in the machine; and, further, a certain method of drying flax, &c.

Isaac Simpson, of Preston, Lancaster, *Improvements in machinery for covering wire, silk, cotton, linen, wool, or any other flexible material, with wire, plate, silk, cotton, linen, wool, or any other flexible material.* Patent dated April 16, 1853. (No. 927.)

Claim.—Certain machinery for covering and plating wire and threads of flexible material, in so far as regards the mode of drawing forward the material to be covered by frictional contact of the roller on which it is wound with a revolving shaft; the employment of a revolving tube for the material to be covered to pass through before coming within the range of the covering arrangement; the application of an instantaneous stop-movement; a mode of producing a drag on the delivering-bobbin, which supplies the material to be covered, so as to regulate the delivery at a uniform rate; and the driving of the receiving-bobbin by frictional contact with a flange on its spindle.

William Walker Stephens, of Edinburgh, Scotland. *The application of retorts in gas-ovens, or other ovens, and of gas-ovens or other ovens which are constructed as retorts, to the process of improving iron, and converting iron into steel.* Patent dated April 18, 1853. (No. 929.)

The inventor, taking for granted that his title sufficiently describes his invention, goes on to say that it is an improvement upon the present method of converting iron into steel as respects the time necessary for the process, the iron being put into and taken out of the retorts or ovens while they are at a high heat.

Richard Ford Sturges, of Birmingham, manufacturer. *A new or improved apparatus for making vegetable and other infusions and solutions.* Patent dated April 18, 1853. (No. 931.)

The claim made by the patentee is for constructing an apparatus to be used for making vegetable and other infusions and solutions in which the solid, or matter to be infused or dissolved, is contained in a receptacle or vessel permeable to liquids, the solid receptacle or vessel being immersed, or partly immersed, and made to revolve in an outer vessel or case containing the water or other solvent with which the said solid matter is to be treated or dissolved.

Joel Watts, of Sleaford-street, Battersea-fields, Surrey. *Improvements in the construction of pistons of steam and other engines, applicable also to force-pumps and lifting-pumps.* Patent dated April 18, 1853. (No. 932.)

This invention has relation to metallic pistons, and consists in the employment of steam or other fluids for the purpose of keeping the segments or rings thereof distended, in lieu of employing the springs ordinarily used for such purpose.

William M'Naughten, of Aberdeen. *Improvements in printing yarns or worsteds for weaving carpets, also in printing carpets, woollen, silk, cotton, and other textile fabrics or fibrous substances.* Patent dated April 18, 1853. (No. 933.)

Claim.—The printing of yarns or worsteds for weaving carpets, also the printing of carpets, woollen, silks, cotton, and other textile fabrics or fibrous substances on one side, or both sides thereof simultaneously, by means of the arrangements of machinery or apparatus described.

William Fawcett and Francis Best Fawcett, both of Kidderminster, Worcester. *Certain improvements in the manufacture of carpets.* Patent dated April 18, 1853. (No. 935.)

This invention has relation to what are known as Florentine and imperial carpets, and consists in producing therein two shades of colour with the same threads of worsted or woollen, by employing the said threads as a looped pile for the lighter shade, and as a cut pile for the darker shade, the simple cutting of the pile producing a sufficient difference of colour to be appreciable in the pattern.

François George Sicardo, of Marseilles, gentleman. *A new rotary steam engine.* Patent dated April 19, 1853. (No. 938.)

This new rotary engine consists of a drum or casing of irregular internal contour, within which revolves a cylinder having six or more sliding pistons of greater length than the diameter of the cylinder, so as to be in contact at their ends with the interior of the drum or casing, and which slide in and out of recesses formed in the cylinder as it is caused to revolve by the action of the steam against the protruded parts of the pistons.

THOMAS NEWEY, of Birmingham, steel pen tool-maker. *Improvements in fastenings for articles of dress.* Patent dated April 19, 1853. (No. 939.)

These improvements consist in a particular arrangement of the parts of a fastening forming two instruments, acting as a hook and eye.

WILLIAM HALE, of Swan-walk, Chelsea, Middlesex, engineer. *New kinds of fire-arms.* Patent dated April 16, 1853. (No. 940.)

This invention relates to apparatus or fire-arms for discharging and giving direction to the flight of rockets or projectiles which carry with them their own motive power.

The inventor describes and claims;

1. The construction of a fire-arm, termed the "Haleon Musket."

2. The construction of a "Haleon Pistol."

3. The construction of fire-arms for giving directions to the flights of rockets by means of wires or rods arranged in a spiral or screw form, so as to produce or facilitate the rotation of the rocket.

4. The construction of fire-arms for giving directions to the flights of rockets by means of wires or rods, or a tube so arranged that the rocket is compelled to pass round one or more curves before leaving the instrument.

LAMBERT ADOLPHE BEAUVAIS, of Upper Charlotte-street, Fitzroy-square, Middlesex. *Improvements in machinery for obtaining wool, silk, and fibres from fabrics, and rendering them suitable to be again employed.* Patent dated April 19, 1853. (No. 941.)

The apparatus described and claimed by the inventor consists principally of a large round tub, or other vessel, the bottom of which is provided with teeth, rasps, or notches, so as to render the surface rough. In this tub is made to rotate a frame which carries other roughened surfaces or rasps that are also made to act on the rasps placed in the tub, which is supplied with certain chemical ingredients, such as soda, carbonate of soda, potash, lime, and oil or other grease. These matters are combined together, and mixed with a suitable quantity of water. The mixture should be maintained at a temperature of from 90° to 100° Fahrenheit, by means of a jet or jets of steam. The claims of the inventor include the employment of the chemical ingredients, as described.

JOHN CHATTERTON, of Birmingham, Warwick. *Improvements in coating tubes.* Patent dated April 19, 1853. (No. 942.)

This invention consists of coating a tube composed of gutta percha, India-rubber, or compounds containing such materials, with lead or other soft metal, by drawing the metal on to the tubes.

FREDERICK HENRY SMITH, of the Borough of Southwark. *Improvements in apparatus for cleansing the interior of tubular boilers and other hollow articles.* Patent dated April 19, 1853. (No. 943.)

This invention consists in forming a brush, in two or more parts, connected at one end by a spring or springs to the end of the handle in such manner that when the handle is drawn or pushed the springs will cause the parts of the brush to separate, and thus the action of the brush upon the tube will be increased.

JOHN FULLER, of Thomas-street, Kennington, Surrey, electrical engineer. *Improvements in galvanic batteries.* Patent dated April 19, 1853. (No. 944.)

Claim.—The employment of solutions of the salts of copper and zinc in divided cells, where pairs of copper and zinc plates are employed in galvanic batteries, as described; and, also, the use of powdered plumbago or powdered coke in constructing a galvanic battery.

CHRISTIAN BÖHRINGER, and GUSTAVUS CLEMM, directors of the Chemical-works, Wohlgelegn, near Mannheim and Heibronn, Baden. *Improvements in the manufacture of soda and potash.* Patent dated April 19, 1853. (No. 945.)

Claim.—The conversion of sulphate of sodium and potassium into carbonates of the respective bases by treatment with bicarbonates of the respective bases, as described.

THOMAS DAY, of Birmingham, Warwick. *An invention for certain improvements in the manufacture of boots and shoes, whereby great ease is secured to the wearer.* Patent dated April 19, 1853. (No. 946.)

Claim.—The application to that part of boots and shoes known as the *waist* of an elastic material, either outside or inside.

ANDREW BLAIR, of Maryhill, Lanark, North Britain, calico printer. *Improvements in propelling vessels.* Patent dated April 19, 1853. (No. 949.)

This invention relates to the construction and arrangement of chain-paddles, in which a series of floats or propelling surfaces is attached to an endless chain passed over suitable driving and supporting drums; and

Mr. Blair's improvements consist in a method of feathering the paddles by means of stop-joints and guides.

John Smethurst, of Manchester, Lancaster, packer. *An improved plan for packing yarn and other materials.* Patent dated April 20, 1853. (No. 950.)

This invention consists in a method of packing by constructing a box, the sides of which are held down, regulated, and drawn together by means of screw-bolts or other such contrivances, which also serve as ends for the box. The top and bottom are grooved out or battened across, so that the binding may be passed round in the grooves, or between the battens, and the package be bound before it is taken from the press. The inventor claims the above arrangement.

Samuel Weight, of Cheltenham, Gloucester. *Improvements in ventilating mines, sewers, or drains; ships, buildings generally, and other localities.* Patent dated April 20, 1853. (No. 951.)

This invention consists in the application of a rotary fly placed within a funnel or conical-shaped box of cast or sheet iron or other metal, to which are connected tubes for exhausting and discharging the contents of a receiver which is placed at or near the bottom of the place to be ventilated; other tubing is conducted from the receiver to various parts of the place to be ventilated. When necessary the inventor employs several receivers, connected together by tubes and pipes; he claims the use of a rotary fly or vanes in combination with a receiver or receivers, as described.

Emile Chappuis, fils, of St. Mary Axe, London. *An improved apparatus for the diffusion of light, to be called "the Myriastratic Reflector."* Patent dated April 20, 1853. (No. 952.)

Claims.—1. The manufacture of a daylight reflector, in which a sheet or piece of glass, having on its surface ribs or corrugations, is employed as described, viz., in combination with a sheet or piece of fluted metal, the corrugations of which are placed transversely to those of the glass.

2. A certain method of constructing a frame for the reflector, which frame shall be impervious to damp or wet.

Henry M'Evoy, of Birmingham, Warwick. *An invention for improvements in the construction of door-bolts.* Patent dated April 20, 1853. (No. 953.)

This invention consists of the following arrangements:

1. Strengthening the plates of door-bolts by slightly raising them, so as to form a rim around them. This is done by stamping them, which, at the same time, sinks the metal round the screw-holes, so as to form a countersink for the heads of the screws used in securing the bolt to a door.

2. Forming a spring or springs in the bolt-plate, for holding the bolt in any required position.

3. Forming stops for regulating the throw of the bolt out of the bolt-plate.

4. Forming out of the bolt-plate, stops for retaining the bolt in or out, as may be desired.

5. Holding the bolt and plate together by means of clips or ears passed through suitable openings from the back of the plate.

6. Moulding and casting plate-bolts of any suitable metal, to which bolt-springs will have to be applied.

7. Certain proposed forms of iron to be used as plate-bolts.

8. Covering the front part or face of the bolt with thin sheet brass.

Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet-street, London, patent agent. *Improvements in inhaling-tubes.* (A communication.) Patent dated April 20, 1853. (No. 955.)

Claim.—The construction of inhaling-tubes in such manner that the breath of the user shall be exhaled under greater pressure than is exerted in the act of inhaling, as described.

Sir William Snow Harris, of Plymouth. *Improvements in lightning-conductors for ships and vessels.* Patent dated April 20, 1853. (No. 957.)

The general plan of these improvements consists in the application of series of plates of metal "to the moveable portions of the mast, and to the head of the lower or fixed mast," in connection with other metallic conductors also permanently fixed in series along the shrouds or lower rigging on each side of the vessel, and finally communicating with the sea by metallic connections fixed to the ship's side.

Claim.—The constructing of lightning-conductors for ships and vessels in such manner as to cause the metal from the lower masts to pass outside of the ship, as described, instead of passing down the lower masts and through the bottom of the ship or vessel, as formerly practised.

Thomas Dunn, of Windsor-bridge Iron-works, Pendleton, near Manchester, Lancaster, engineer. *Certain improvements in and applicable to boilers or apparatus for generating steam, and in apparatus connected therewith.* Patent dated April 21, 1853. (No. 959.)

This invention consists in—

1. A mode of strengthening "wagon" boilers by placing a number of cylindrical stays from one side to the other, connecting those parts which are concave externally;

and in arranging the flue so that it leads from the furnace to each of these staves, which are severally connected with the chimney.

2. In corrugating the sides and tops of the inner fire-boxes of tubular boilers.

3. In constructing steam-generating apparatus of a combination of a series of cylinders of generally small diameter, of such length and diameter as to render them conveniently portable, and duplicates of each other, so that they may be intercharged; and in an improved mode of forming the fire-bridges.

4. In modifying the last-named apparatus so as to adapt it to marine purposes.

5. In forming a "fusion plug" of a cone of one metal that will not readily melt, covered with a crust of another that is fusible at the given temperature.

Charles Reeves, junior, of Birmingham, Warwick, manufacturers. *An improvement or improvements in swords.* Patent dated April 21, 1853. (No. 960.)

Claim.—Making the tangs of swords of the same, or nearly the same breadth as the blades.

Juan Duran, of Madrid, Spain, gentleman. *Obtaining and applying motive power.* Patent dated April 21, 1853. (No. 961.)

The complete specification of this patent was filed with the application.

The inventor states his object to be that of obtaining perpetual motion, and the application thereof to machinery; and he certainly displays great ingenuity in the construction of the details of his apparatus, the *general principles* of which may be seen from the following description, which we intend to include only the principal features of the invention. A large wheel has a number of small ones fixed on centres around its outer part, the planes of the small wheels being parallel to that of the large one. These smaller wheels have each a weight placed at one part of its circumference, which weight revolves with the wheel to which it is attached. The small wheels are also furnished with cogs round their circumferences. A short cogged surface is also placed below the great wheel, and a similar one at its upper part; the cogs or teeth of these surfaces are made to take successively into those of every small wheel that is brought to them by the revolution of the large wheel, and so to give a rotary motion to each small wheel in order. Before the machine is started, the small wheels are so arranged that all the weights attached to them are without the great wheel on one side, and within it on the other, in consequence of which the said great wheel not being balanced about its centre, will begin to revolve; and as each small wheel, after descending to, moves along the lower cogged surface, the weight attached to it is turned up to the inner part of the great wheel, and ascends in that position; while, on the other hand, as each small wheel, after ascending to, moves along the upper cogged surface, the weight attached to it is turned to the outer part of the great wheel, and descends in that position. By this arrangement it is expected that the large wheel will be kept unbalanced about its axis, and a perpetual motion of it preserved.

Henry Carr, of Peterborough. *Certain improvements in the construction of railways.* Patent dated April 21, 1853. (No. 962.)

This invention consists—

1. In forming the inner part of the wing-rails of railway crossings solid, instead of with an overhanging flange, as in the ordinary crossing of formed rails.

2. In strengthening the middle and overhanging flanges of the point or point-rails by the introduction of a filling-piece.

3. In constructing the two middle chairs of a railway crossing in such manner that the whole of the rail, when placed in each chair, shall be wedged up by driving in two wooden keys.

4. In supporting in a similar manner with filling-pieces the upper flanges of switches and stock-rails of the ordinary form, where the wheels bear partially upon the rails.

James Petrie, of Rochdale, Lancaster, engineer. *Certain improvements in steam engines.* Patent dated April 21, 1853. (No. 963.)

This invention consists in an arrangement of apparatus to be applied to condensing engines for the purpose of heating the water previously to its being fed into the steam boiler, by means of the exhaust steam in its passage to the condenser.

Philip Harris, of the Royal Marine Barracks, Chatham, Kent, lieutenant Royal Marine Forces. *Certain improvements in fire-arms.* Patent dated April 21, 1853. (No. 964.)

This invention consists in forming the triggers of guns of a lever, one end of which is an arc of a circle, to which is attached a circular-shaped wedge, formed of the same piece of material as the lever, the wedge being constructed to any desired pitch or angle constituting an eccentric or cam.

William Robjohn, of Islington, London. *An improved meter for measuring and indicating the measure of liquids.* Patent dated April 21, 1853. (No. 965.)

The inventor describes and claims an arrangement of apparatus composed of a piston and a system of levers, by which exactly half a gill is made to pass through the meter at every rise and fall, and which, by means of a system of train-wheels, is duly indicated by the dial-plate.

William H. Johnson, of Granville, Hampden, Massachusetts, United States, machinist. *Sewing cloth, leather, and other materials.* Patent dated April 21, 1853. (No. 966.)

This invention consists in producing a certain stitch with a single thread by the employment of one needle, used in connection with a double spring hook, over which the loops are formed, the needle working vertically, and having a vibratory side motion, so that each time it passes through the material to be sewn, the latter is moved forward a sufficient distance to bring the succeeding perforation in its proper place. And further, in attaching the spool holding the supply of thread to the extremity of the vertical needle bar, so that in all positions of the needle the distance between the spool and needle's eye should be constant, thereby permitting the thread to be delivered without jerks.

William Edward Newton, of Chancery-lane, Middlesex, civil engineer. *Improvements in machinery for bending wood or other materials.* (A communication.) Patent dated April 21, 1853. (No. 967.)

This invention relates to a method of bending wood for plough handles, vehicle shafts, and other such purposes. It consists of constructing and applying a mould-lever, with other accompanying apparatus, for effecting certain upsetting and relaxing movements, the objects of which are to preserve the outer parts of the bent wood from separating, while the inner will be upset and yield to the pressure.

James Davis, of Hemel Hempstead, Hertford, engineer and agricultural-implement maker. *Improvements in the manufacture of threshing-machines.* Patent dated April 22, 1853. (No. 969.)

This invention relates to such threshing-machines as are fitted with a drum containing beaters, and a concave segment frame or case, carrying pegged or indented bars for the purpose of acting upon the ears of corn. In the inventor's arrangement, the pins or projections upon the beaters will not enter the spaces between the pins or beaters upon the stationary bars, but when rotating will describe a circle within the cutter. The beaters are formed complete from the solid bars of iron, being first rolled into a peculiar sectional form; and certain of the projecting parts are cut down by a hollow rose or other tool, so as to form a line of pins or studs. A square edge is thus obtained in front of the beater, which is intended to improve the action of the machine.

William Sager, of Seacombe, Chester, gentleman. *Improvements in machinery or apparatus for propelling vessels.* Patent dated April 22, 1853. (No. 970.)

This invention consists in attaching the propelling floats to vertical rods ranged along the sides of the vessel in about the same position as is now occupied by the ordinary paddle-wheel. Each pair of the rods is connected to a separate crank-arm, at a point just above the float, the upper end of the rods being allowed to slide in swivel-guides. A number of these rods are connected together, so that rotary motion may be communicated to several of the cranks and rods together. When this is the case it will be seen that, as the cranks pass through the lower halves of their revolutions, the floats will be carried into and urged through the water, while, during the remainder of the revolution, they will be drawn out, and brought round into their former position, and so on continually.

Cyprien Marie Tessie du Motay, of Rue Fontaine St. George, Paris, engineer and chemist. *Improvements in preparing oils, and in apparatus for burning the same.* Patent dated April 22, 1853. (No. 974.)

This invention consists; 1. In causing oils obtained by distilling animal, vegetable, resinous, and bituminous substances, which are rich in carbon, to be acted upon by hydrogen, which may conveniently be done by mixing zinc, or other suitable metal, with acid in presence of the substance.

2. In arranging lamps, so as to render them capable of burning oils which are rich in carbon, by bringing two currents of air in contact with the exterior part of the flame.

Jerome Andre Drieu, of Bowden, Chester, machinist. *Improvements in cutting the pile of velvet, velveteens, and other piled fabrics.* Patent dated April 22, 1853. (No. 975.)

This invention consists in applying a grooved instrument which is passed under the yarn or fibre to be cut, there being a revolving cutter combined with the instrument which, by its rotation, cuts the yarn or fibre as the instrument is progressively passed under.

Edward Onslow Aston and George Germaine, both of Millwall, Middlesex, master mariners. *Improvements in compositions for coating wood, metal, and other materials exposed to the action of sea-water or to the weather.* Patent dated April 23, 1853. (No. 976.)

This invention refers to mineral compositions prepared principally from sulphur and salts, or oxides of copper, which are applied in a hot liquid state.

Claim.—The use of sulphur combined with any oxides, sulphurets, or salts of copper, for the purposes described.

Thomas Knowles, of Newton, Lancaster, manufacturer. *Improvements in the*

machinery or apparatus for picking warps. Patent dated April 23, 1853. (No. 978.)

Claims.—1. The employment of a warping mill and picking-frame at the same time, together with a general arrangement of apparatus.

2. A particular clip-cove, or holder.

3. The employment of healds for taking or forming the leashes.

4. A peculiar form of tooth, having two vertical sides or edges to form the ratchet-wheel attached either to the mill-box pulley or to its shaft.

5. An improved creel-peg.

FREDERICK JOHN WILSON, of Cadogan-place, Chelsea, Middlesex. *An improved wheelbarrow.* Patent dated April 23, 1853. (No. 979.)

This invention seems to consist in bringing the wheel of the barrow nearer to its centre, and allowing it to pass up through the bottom, an iron cap being placed over it.

HENRY HOULDSWORTH, of Manchester, Lancaster, cotton-spinner. *Improvements in machinery used for combing cotton, silk, silk-waste, flax, tow, wool, and other fibrous substances.* Patent dated April 23, 1853. (No. 981.)

The object of these improvements is to simplify the construction of Heilmann's machine, patented in 1846.

Claims.—1. The use of an eccentric or cam for producing the combined movements of the nippers, the nipper-roller, and the upper comb.

2. The placing of the feed-rollers within the swing-piece, and the giving of the required movements to the feed and lap-rollers, and to the doffer-cylinder and comb by an eccentric or cam.

3. The modes of producing the direct and reverse motions of the nipping-roller, the distinguishing feature of which is that such motions are derived from rotary, and not from reciprocating cam action.

4. Single, as opposed to the forked nipping-roller fingers; and a mode of weighting the top nipping-rollers, so as render the single fingers effective.

5. The limiting the action of the revolving brush on the combing cylinder to any required part of a revolution.

6. All equivalent modifications of the above applied to the same purposes.

PROVISIONAL PROTECTIONS.

Dated May 25, 1853.

1281. William Bauer, of Munich, Bavaria, engineer. Improvements in the construction of vessels to be used chiefly at various depths under the surface of the water, and in machinery or apparatus connected therewith, for propelling, balancing, and steering the same, and for carrying on operations of various kinds on or under the surface of the water from within, upon objects without such vessels.

Dated September 9, 1853.

2073. Philip Grant, of Manchester, Lancaster, letter-press printer, and John Doherty, of the same place. Improvements in the mode or method of cutting and finishing brass rule and wood reglet, used in the art or process of letter-press printing and other similar purposes, and in the machinery or apparatus employed therein.

Dated September 12, 1853.

2111. Louis Achille Brocot, of Paris, France, clock-manufacturer. An improved construction of astronomical calendar.

Dated September 17, 1853.

2163. Arthur John Baker, architect, of Burton-crescent, London. Strengthening vessels of timber and iron.

Dated September 19, 1853.

2171. Charles Collins, of Hartford, Connecticut, United States of America, manufacturer. The manufacture by machinery of tubes from leather or other suitable flexible substance, chiefly for covering the drawing rolls of spinning machinery, but also applicable to other purposes.

Dated September 26, 1853.

2213. Francis Frederick Clessman, of Park-lane, Hyde-park, Middlesex, gentleman. The production and application of certain materials to be employed in the manufacture of textile fabrics, and for other purposes.

Dated October 1, 1853.

2243. John Summerscales, shuttle-maker, and Benjamin Bancroft, shuttle-maker, both of Keighley, York. Improvements in shuttles employed in weaving textile fabrics.

2245. Thomas Woodcock, of Pultney-terrace, Islington, Middlesex. Improved machinery for carving, cutting, chiselling, and engraving.

2247. Jean Marie Letestu, engineer, of Paris, French Empire. Certain improvements in propelling ships and vessels.

2249. Isaac Ambler, of Manningham, near Bradford, York. Improvements in preparing or combing wool and other fibrous substances.

2251. Robert Halliwell, of Bolton-le-Moors, Lancaster, mechanic, and William Johnson, of Farnworth, in the same county, manager. Improvements in machinery for spinning and doubling cotton and other fibrous substances, and for grinding cards.

Dated October 3, 1853.

2253. Michael Dwyer, of Unity-place, Samuel-street, Woolwich, Kent, commander, Royal Navy, and James Brown, of Bridge-terrace, Mile-end, Middlesex, machinist. An improvement in anchors.

2255. William Joseph Thompson, of North Shields, Northumberland, Russian vice-consul. Improvements in heating reverberatory and other furnaces. A communication.

2257. James Leadbetter, of Halifax, York, brazier, and William Wight, of the same place, plumber. Improvements in machinery or apparatus for raising fluid and solid substances.

2259. Alfred Stanistreet Jee, of John-street, Adelphi, civil engineer. Improvements in the construction of rails for railways.

Dated October 4, 1853.

2261. Peter Rothwell Jackson, of Salford, Lancaster, engineer. Improvements in machinery for manufacturing hoops and wheels.

2263. Henry Jacob Jordan, of Berner's-street, Middlesex, gentleman. An improved medicine for the cure of venereal affections, which he denominates "the Treiseman." A communication.

2265. William Crofts, of Derby-terrace, Nottingham-park, manufacturer. Improvements in weaving.

2267. Nevil Smart, of Merton, Surrey, brickmaker. Improvements in the manufacture of bricks.

2269. William Gossage, of Widnes, Lancaster. Improvements in obtaining certain saline compounds from solutions containing such compounds.

Dated October 5, 1853.

2271. Joseph Holmes, of Portsea, Hampshire, gentleman. Improvements in soldiers' or mess canteens, and other articles for containing food.

2273. John Wright, of Rochester, Kent, civil engineer. Improvements in apparatus to facilitate the landing and embarking of passengers from steam-boats and other vessels.

2275. Henry John Betjeman, of New Oxford-street, Middlesex. Improvements in apparatus for fixing capsules on the necks of bottles and other vessels.

2277. Samuel Leake Worth, of Oxford-street, Middlesex, brush-maker, and Aymond Dishin Vesey Candvan, of Fitzroy-street, Middlesex, late sergeant-saddler in the 10th Light Dragoons. An improved polishing and brightening surface.

2279. John Mason, of Rochdale, Lancaster, machinist. Improvements in preparing cotton for spinning, and in machinery or apparatus for effecting the same.

Dated October 6, 1853.

2281. John Milner, of Stratford, Essex, engineer. Improvements in steam engines.

2283. Joseph Henry Cary, of Norwich, pianoforte-action maker. An improved pianoforte action for upright pianofortes.

2285. Manuel Fernandez De Castro, of Madrid, Spain, mining engineer. Improved means of preventing accidents on railways.

2287. Henry Goddard, of Castle-gate, Nottingham, kitchen-range manufacturer. Improvements in stoves and kitchen ranges.

2289. John Rubery, of Birmingham, Warwick. Improvements in the manufacture of umbrella and parasol furniture. A communication.

Dated October 7, 1853.

2291. George Elliins, of Droitwich, Worcester, gentleman. New or improved machinery for thrashing or separating the stem and husk from the grain or seed of wheat, barley, flax, and other plants.

2293. James Bullough, of Accrington, Lancaster, John Walmsley and David Whittaker, of Blackburn, in the same county. Improvements in machinery or apparatus for warping and sizing or otherwise preparing yarns or warps to be woven.

2295. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in apparatus for compressing or rarefying air or other elastic fluids. A communication from Germain Sommeiller, of Turin, engineer.

2299. Thomas Lambert, of Short-street, New-cut, Lambeth, Surrey, brass-founder. Improvements in ships' water-closets.

2301. Francis Whitehead, of Crayford, Kent, draughtsman, and William Whitehead, of the same place, block-cutter. Improvements applicable to lanterns, lamps, lamp-shades, and reflectors for reflecting, concentrating, or diffusing light.

Dated October 8, 1853.

2303. Joseph Denton, of Prestwich, near Manchester, Lancaster, mechanical engineer. Improvements in looms for weaving.

2307. William Wilkinson, of Nottingham, frame-work knitter. Improvements in protecting telegraph wires.

2309. William Potts, of Birmingham, Warwick. Improvements in mantelpieces.

2311. Charles May and James Samuel, both of Great George-street, Westminster, civil engineers. Improvements in joining the ends of the rails of railways.

2313. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improvements in fire-arms and cartridges. A communication.

Dated October 10, 1853.

2315. Henry Rawson, of Leicester, manufacturer, and Thomas Whitehead, of the same place, mechanic. Improvements in regulating the flow of air to steam-boiler furnaces.

2317. George Ferguson Wilson, of Belmont, Vauxhall, managing director of Price's Patent Candle Company. Improvements in the manufacture of candles and night-lights.

2319. Frederick Warner, of John Warner and Sons, Crescent, Jewin-street, City, and John Shelton, foreman of John Warner and Sons. Improvements in the manufacture of large bells.

2321. Hugh Lee Pattinson, of Scot's-house, near Gateshead, Durham, chemical manufacturer. Improvements in the manufacture of sulphuric acid.

Dated October 11, 1853.

2323. Henry Kemp, of Barkam-terrace, Southwark, gentleman. Certain improvements in the preparation of wood for sheathing ships, so as to substitute for copper and other metals; also in house, ship, and pier-building, &c., &c.

2325. Louis Alexandre Parjon Demoulin, engineer, of Rue Sedaine, Paris, France. Improved apparatus applicable to carriages on common roads for the prevention of accidents, and increasing the power of locomotion.

2327. David Dick, of Paisley, Renfrew, North Britain, machinist. Improvements in the manufacture of flexible tubes or pipes.

2329. James Worrall, junior, of Salford, Lancaster, dyer and finisher. Certain improvements in the method of dying fustians and other textile fabrics, and in the machinery or apparatus connected therewith.

2331. James Hall Nalder, of Alvescott, Oxford, farmer, and John Thomas Knapp, of Clanfield, in the same county, machinist. Improvements in winnowing or dressing corn.

2333. James Harris, of Hanwell, Middlesex, engineer. Improvements in apparatus for heating water and other fluids.

2335. James Webster, of Leicester, engineer. Improvements in water-gauges for steam boilers.

2337. Bernard Cowan, of Fenchurch-street, London. Improvements in giving signals on railways.

PATENTS APPLIED FOR WITH COMPLETE SPECIFICATIONS.

2340. Nicholas Callan, of the R. C. College of Maynooth, Kildare, Ireland. A means of protecting iron of every kind against the action of the weather, and of various corroding substances: so that the iron thus protected will answer for roofing, cisterns, baths, gutters, pipes, window-frames, telegraphic wires for marine and various other purposes. October 12.

2368. Théodore Benoit Warée, of Paris, France. Certain improvements in apparatus for measuring the pressure of air, steam, gas, and liquids. October 13.

2380. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, London. Certain improvements in the treatment of copper ores. A communication. October 15.

2381. Charles Joseph Louis Cloux, junior, of France. A process for the preparation of hemp, after the stripping. October 15.

2385. Antoine Corvi, organ-builder, of Paris, France. Improvements to stationary and portable organs, with keys and cylinder. October 15.

NOTICES OF INTENTION TO PROCEED.

(From the "London Gazette," October 21st, 1853.)

1229. William Edward Newton. Improved machinery or apparatus applicable for pumping water and supplying steam boilers with water, and maintaining the water therein at a proper level. A communication.

1231. William Bauer. Improvements in the construction of vessels to be used chiefly at various depths under the surface of the water, and in machinery or apparatus connected therewith, for propelling, balancing, and steering the same, and for carrying on operations of various kinds on or under the surface of the water from within, upon objects without such vessels.

1288. Alexander Porecky. Improvements in the manufacture of umbrellas and parasols.

(From the "London Gazette," October 25th, 1853.)

1250. Henry Gilbert. Improvements in apparatus for cleaning boots and shoes.

1254. William Carr Thornton. Improved machinery for making wire-cards.

1278. George Irland Higginson. Improvements in machinery or apparatus for evaporating or concentrating liquids.

1270. Frederick Russell. Improvements in raising and lowering windows, shutters, blinds, and similar appendages.

1323. Alfred Whaley Sanderson. Improvements in preparing effervescing powders.

1348. Joseph Whitworth. Improvements in machinery for cutting and harvesting corn, grass, and other crops.

1350. Joseph Whitworth. Improvements in machinery for perforating or punching paper, card, and other materials.

1352. William Thorold. Improvements in the construction of portable houses, and in machinery for raising, moving, and lowering the same.

1363. Ferdinand Louis Gossart. A system of permanent circulation of caloric intended to produce and overheat steam, gas, and liquid.

1390. Alexander McDougall. Improvements in the manufacture of potash and soda-ash.

1408. Henry Bernoulli Barlow. Improvements in machinery for spinning, doubling, and twisting cotton and other fibrous substances. A communication.

1420. Joseph Spencer. A new or improved cupelo.

1439. Joseph H. Penny, and Thomas B. Rogers. A new and useful improvement in the manner of constructing machinery for propelling vessels, and other machinery which they term a crank propeller.

1445. Arthur Parsey. A revolving engine to be worked by steam, air, gases, or water.

1468. Peter Armand Lecomte de Fontainemoreau. Improvements in the preparation of certain vegetable and alimentary substances. A communication.

1527. Noel Natalis du Chastaingt. An improvement in bread-making.

1534. Joshua Horton, junior. An improvement or improvements in steam boilers.

1569. John Imray. Improvements in obtaining motive power.

1583. Richard Bradley and William Craven. Improvements in the moulding, forming, and compressing of clay for the manufacture of bricks, tiles, and other earthenware.

1633. Philippe Poirier de St. Charles. Improvements in apparatus for measuring and indicating the distance travelled by cabs and other vehicles.

1702. James Naylor. Improvements in lamps.

2171. Charles Collins. The manufacture by machinery of tubes from leather or other suitable flexible substance, chiefly for covering the drawing-rollers of spinning-machinery, but also applicable to other purposes.

2189. Thomas Smedley. An improved railway-train signal, communicating between the guard and engine-driver.

2195. George White. An improvement in paddle-wheels. A communication.

2213. Robert Brisco and Peter Swires Horsman. Certain improvements in the preparation of flax and other vegetable fibrous substances.

2225. William Edward Newton. Improved machinery for cutting metal or other substances. A communication.

2229. Robert Brisco and Peter Swires Horsman. Certain improvements in machinery for heckling flax, hemp, China grass, and other fibrous substances.

2249. Isaac Ambler. Improvements in preparing or combing wool and other fibrous substances.

2251. Robert Halliwell and William Johnson. Improvements in machinery for spinning and doubling cotton and other fibrous substances, and for grinding cards.

2255. William Joseph Thompson. Improvements in heating reverberatory and other furnaces. A communication.

2261. Peter Rothwell Jackson. Improvements in machinery for manufacturing hoops and wheels.

2269. William Gossage. Improvements in obtaining certain saline compounds from solutions containing such compounds.

2273. John Wright. Improvements in apparatus to facilitate the landing and embarking of passengers from steam-boats and other vessels.

2287. Henry Goddard. Improvements in stoves and kitchen ranges.

2289. John Rubery. Improvements in the manufacture of umbrella and parasol furniture. A communication.

2293. James Bullough, John Walmsley, and David Whitaker. Improvements in machinery or apparatus for warping and sizing, or otherwise preparing yarns or warps to be woven.

2295. John Henry Johnson. Improvements in apparatus for compressing or rarefying air or other elastic fluids. A communication.

2305. Joseph Denton. Improvements in looms for weaving.

2307. William Wilkinson. Improvements in protecting telegraph wires.

2309. William Potts. Improvements in mantelpieces.

2311. Charles May and James Samuel. Improvements in joining the ends of the rails of railways.

2315. Henry Rawson and Thomas Whitehead. Improvements in regulating the flow of air to steam-boiler furnaces.

2340. Nicholas Callan. A means of protecting iron of every kind against the action of the weather, and of various corroding substances: so that iron thus protected will answer for roofing, cisterns, baths, gutters, pipes, window-frames, telegraphic wires for marine and various other purposes.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed October 24, 1853.

998. George Kennedy Geyelin.

Sealed October 26, 1853.

727. Alexander Prince.
1002. Auguste and Jean Le Roy, and Eugené Pavy.

Sealed October 27, 1853.

1012. Richard Howson.
1014. Joseph Walter Gale.
1020. James Andrew Bruce.
1021. Thomas Culpin.
1028. Joseph Hetherington.
1035. William Armand Gilbee.
1041. Thomas Collins Banfield.
1042. Thomas Collins Banfield.
1053. Weston Grimshaw.
1134. Edward Beaumont.
1136. David Law and John Inglis.
1144. Thomas Murray.
1191. George Coppock.
1208. Thomas Richardson.
1214. Charles James Pownall.
1235. Job Allen.
1256. John Blair.
1572. James Tatlow and Henry Hodgkinson.
1593. Richard Archibald Brooman.
1761. John Giblett.
1812. John Slack.
1875. Thomas Frederick Newell.
1884. Richard Archibald Brooman.
1886. Richard Archibald Brooman.
1907. Joseph Léon Talbot and John Davies Morries Stirling.
1909. George Edward Dering.
1912. James Stewart.
1929. Robert Clough.
1942. Charles Watt and Hugh Burgess.
1991. John Davies Morries Stirling.
2011. Jámes Picciotto.
2013. William Edward Newton.
2021. William Edward Newton.
2027. Robert Oxland.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

NOTICE TO CORRESPONDENTS.

Mr. William Gibson, of Thornton, enquires—"How antimony is made to combine with lead?" We are not aware of any peculiar difficulty attendant on the operation of combining antimony with lead by melting. Both these metals are fusible below a red heat, and can be made to combine readily, in almost any proportions, simply by stirring them whilst in a melted state, and until they begin to solidify. Care should, however, be taken not to employ a temperature much higher than is required to produce fusion, otherwise the resulting alloy becomes harsh and brittle. It is also desirable that the cooling of the alloy should not proceed too slowly, as the crystallization of one or other of the component metals would be thereby favoured, and the alloy consequently rendered brittle. The alloy of lead and antimony, in the proportions of three parts lead to one antimony, forms type-metal. Antimony may also be combined with gold, silver, copper, iron, tin, and zinc, for producing alloys, some of which present very peculiar characteristics—that of antimony and iron for instance, inflaming under the heat produced by the action of a file.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1578.] SATURDAY, NOVEMBER 5, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

CULPIN'S PATENT STEAM BOILERS, FEED-PUMP, AND GAUGES.

Fig. 1.

Fig. 2.

Fig. 3.

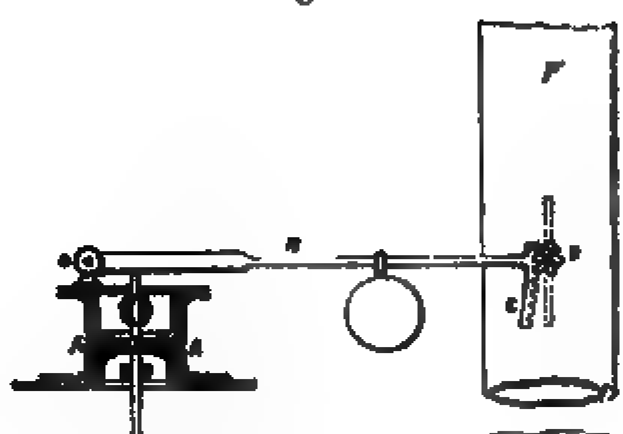
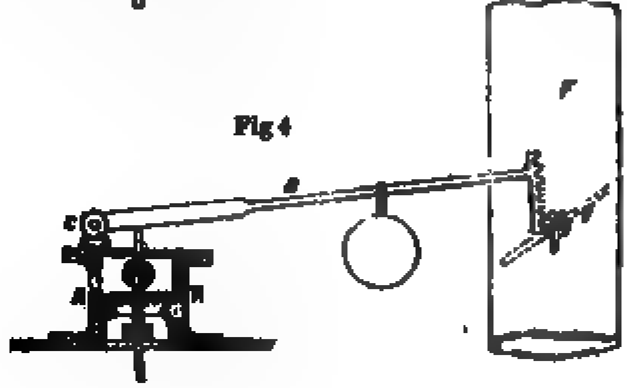


Fig 4



CULPIN'S PATENT STEAM BOILERS, FEED-PUMP, AND GAUGES.

(Patent dated April 27, 1853.)

MR. CULPIN'S invention has relation; *Firstly*, to the construction of the fire-boxes of steam-boilers in such a way as to render the consumption of fuel and gases more perfect, and at the same time afford a ready means for raking out the cinders from the ash-pit. In boilers of the ordinary construction, the bridge is so placed that the flame is made to impinge upon the upper surface of the flues and furnace, the space for the passage of the flame and smoke being at the top or upper part, whereas in boilers of the improved construction, the bridge is placed at the upper portion of the flues or furnace, and the flame and smoke thereby caused to pass through the spaces between the fire-bars (which are made longer than the ordinary fire-bar), and impinge upon the lower portion of the flue. The division-plate between the flues and the ash-pit is constructed with a hinge beneath the fire-bars, whereby it is capable, when necessary to rake or clean out the flues, of being raised so as to afford sufficient space for such purpose.

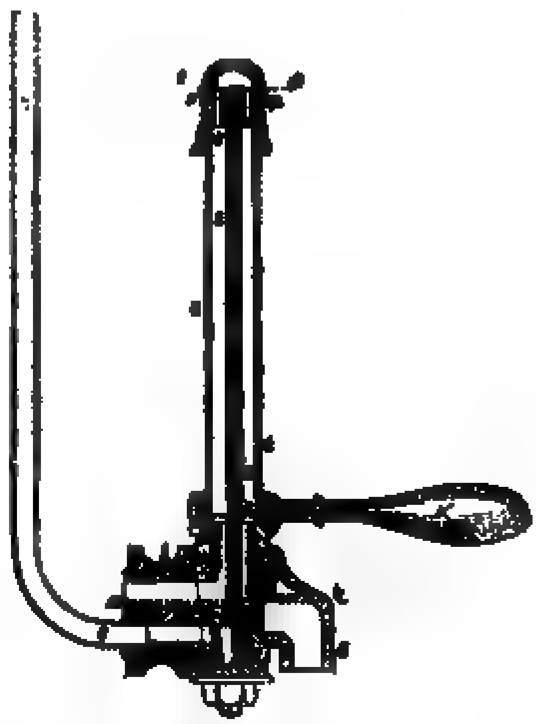
Fig. 1 of the accompanying engravings represents a longitudinal section of a Cornish boiler constructed according to this part of the invention, and fig. 2 a cross section of the same. A A is the shell of the boiler, and B the furnace-tube. C C are the fire-bars, of the peculiar shape represented in fig. 1. D is the division-plate, hinged at *a a* to the brickwork, so as to allow of its being lifted when necessary to rake out the ash-pit. E E is the bridge of the furnace, which also forms the end-plate to the furnace-tube, B. F F are the flues which communicate between the furnace and the smoke-box, G. The arrangement of these flues is shown in the section in fig. 2; the dotted lines and numerals 1, 2, 3, 4, 5, represent the connections between the respective pairs. The smoke and flame, after passing through the flues, F F, pass into and traverse the flues, H H, being prevented from entering direct into the chimney, I, by the division-plates, K K. L L are other flues communicating with the flues, H H, and the chimney, I. M is the steam-chest, and N the safety-valve. The front or smoke-box is secured to the shell of the boiler by bolts and nuts, so that the whole of that portion of the boiler may be readily removed when necessary to clean out the boiler and flues.

Secondly. The invention consists in working the damper in the chimney or flue of steam boilers by means of the waste steam as it issues from the safety-valve. Figs. 3 and 4 represent this arrangement. A is the safety-valve, the seat, *a*, of which is carried slightly up in the form of a cylinder, the diameter of which exactly corresponds with the diameter of the upper surface of the valve. B is the weighted lever centred at *c*, and terminating in the toothed segment, C, the teeth of which gear into the teeth of a pinion, D, keyed upon the spindle of the damper, E, in the chimney, F, of the boiler. By this arrangement, when the pressure of the steam in the boiler is high enough to raise the safety-valve, the valve is caused to rise in the cylindrical portion of the seat before the steam can blow off, whereby the weighted lever is also raised, and the pinion, D, thereby caused to rotate, and close the damper instantaneously, so as to shut off the draught to the furnace until the steam is reduced to the required pressure, when the valve falls, and the damper is again instantly opened. In fig. 3 the valve is represented as down in its seat and the damper open, and in fig. 4 the valve is open and the damper closed.

Thirdly. The invention consists in working the feed or supply of steam boilers by means of a syphon arrangement connected with the interior of the steam boiler and the pump. Fig. 5 represents a section of an ordinary feed-pump with Mr. Culpin's additions thereto. A A is the barrel of the pump, and B the plunger connected by the rod, C, to a crank, D, on the engine shaft, E. F is the suction-pipe, and G the feed-pipe to the boiler. H and I are the ordinary valves; K is the syphon-pipe, which communicates with the interior of the boiler and the pump above the suction-pipe. L is a double-faced valve for alternately opening and closing the suction and syphon-pipes. N is a rod passing through the stuffing-box, M, and attached at its lower end to the valve, L. This rod is passed through the brackets, $a a^1$, and has fixed to it the button, *c*. *e* is a helical spring upon the rod, N, which exerts a downward pressure upon the valve, L, so as to always leave the passage open from the boiler into the pump through the syphon-pipe, excepting at such times when the valve, L, is operated upon in the manner hereinafter explained. P is a tappet attached to the upper surface of the plunger of the pump, and rising and falling with it. The end, *g*, of this tappet embraces the rod, N, and slides up and down upon it, according to the motion of the plunger. The action is as follows:—Supposing the water in the boiler to be below the level of the end of the syphon-pipe, and the plunger down, the valve, L, would be also

down, thereby shutting off the suction-pipe and opening the communication between the boiler and the pump through the syphon-tube, whereby the pump would be filled with steam, which would continue until the plunger had risen to that determinate point of its stroke so as to bring the end, *g*, of the tappet, P, in contact with the button, *e*, on the rod, N, whereby the valve, L, is raised, the communication with the boiler closed, and the suction-pipe opened, so as to allow the feed-water to flow in and condense the steam, and fill the barrel of the pump. On the down-stroke of the plunger, the valve, H, is closed, and the water is forced through the valve, I, into the boiler. At the same time the button, *e*, being released by the falling of the tappet, the valve, L, closes the communication with the suction-pipe and opens that of the syphon-pipe, when, upon the up-stroke of the plunger, the barrel is again filled with steam, which continues as long as the water in the boiler is below the level of the end of the syphon-pipe. When, however, the water in the boiler rises above the syphon-pipe, the barrel of the pump then becomes filled with the water from the boiler, whereby any fresh water from the suction-pipe is prevented from entering the pump, and the water is returned to the boiler through the feed-pipe, so that the syphon-pipe always maintains the water at its proper and required height in the boiler.

Fig. 5. Fig. 6.



Fourthly. The invention consists in an improved water and steam gauge,—which can be used separately or in combination—so constructed as to dispense with two of the cocks ordinarily used, together with their stuffing-boxes. Fig. 6 represents a longitudinal section of this gauge. A A is the cock, the interior of which is divided into two chambers by a division, B; the upper chamber is in communication with the water in the boiler, while the lower one opens into a pipe, C, which is continued up into the steam space so as always to be filled with steam when the boiler is at work. D is the plug of the cock, which is made hollow, and is in communication, when open, with both the water and steam-chambers. E is a pipe, the lower end of which is screwed into the division, B, and opens into the steam space. The pipe, E, is continued upwards through the hollow plug to above the water-line, and is closed with a cap, F, which is pierced with a circle of holes concentric with the exterior of the tube, E, and above the water-line in the boiler. These holes open into a glass tube, G, concentric with the steam-pipe, which is held at top by the cap, F, the lower end being let into the hollow part of the plug, and opening into the water-chamber of the cock. The upper and lower ends of the glass tube are kept steam-tight by India-rubber rings, *ee*. By the arrangements above described, when the cock is opened, water and steam are admitted into the glass tube, whereby the height of the water in the boiler is indicated. There are two other ways opening into the plug of the cock, and communicating the one with the steam-chamber of the cock, and the other with the water-chamber, so that, when the plug is turned by means of the handle, K, one quarter round to the left, the steam can be blown off, and, by reversing the direction of the handle, the water can be withdrawn. Both the steam and waterways may be completely shut off by turning the plug in the opposite direction to that represented in fig. 6.

Fifthly. The invention consists in an apparatus for indicating the pressure of the steam in the boiler. Fig. 7 is a vertical section, and fig. 8 a plan, partly in section, of an indicator, shown as applied to the top of the steam and water-gauge. A is the pipe in communication with the steam in the boiler; and P the cap, which is perforated with a circle of holes, *a a*. C is a flange cast in a piece with the cap, and D a second flange screwed upon the upper part of the cap. E is a spiral spring placed between the flanges, C and D, and surrounding the cap, but having a sufficient steam space for the steam to enter from the holes *a a*. F is an India-rubber ring concentric with the spring, E, surrounded by a

Fig. 7. Fig. 8.

second spiral spring, G, one end of which is formed with an index-hand, H. I, is a semicircular index, graduated to the required number of pounds pressure, and attached by screws to the upper flange, D. The action of this indicator is as follows:—The steam, as it issues through the holes, *a a*, in the cap, exert a pressure upon the inner spring, E, tending thereby to expand or open it out, which expansion is communicated to the India-rubber ring, F, and second spring, G, whereby the pointer, H, is made to traverse round the index, I, and indicate the pressure of the steam in the boiler in pounds.

NEW AMERICAN THRESHING-MACHINE.

We are not surprised that American journalists should so frequently remind us that the American people are altogether outstripping our own countrymen in mechanical ingenuity and inventive power. Such intimations, however fabulous in their character, come very inoffensively from the writers of a nation to which all others look for amusing displays of conceit and arrogance. We all know the ardent attachment of that people to a species of literary and scientific pyrotechnics; all their productions go up as rockets, but most of them come down as sticks. The laudatory adjectives of our language glitter profusely on almost every page of their literature.* As there is but little novelty, so there is but little importance, in all this. We anticipate swagger from the Americans, and are not startled when they "cut a shine!"

But the matter assumes quite another aspect when influential journals of our own country lend their influence to a system of contemptible puffery, and that too at the expense not only of our own inventors and manufacturers, but also of true scientific progress. The following article, published in the *Times*, with editorial sanction, is a specimen of that foolish exaltation of America, and that dishonest depreciation of England that we now refer to:

"Some time ago, our New York correspondent, referring to a few of the more remarkable contributions to the American Exhibition, noticed with especial commendation an improved threshing-machine, or, as it is called on that side of the Atlantic, "grain-separator." This imple-

* In justice we are bound to say, and we do so with pleasure, that a very sensible improvement in this respect has lately taken place in some of the American scientific journals. The *Scientific American* may, at the moment, be cited as an example of this.

ment, which was patented in 1852 by its inventor, Mr. Moffitt, of Cincinnati, has now been brought over to this country; and yesterday Mr. Mechi (who in his go-ahead tendency may be considered an English Yankee,) subjected it to a public trial at Tiptree. Its performance well entitles it to the attention of agriculturists, and we have no hesitation in saying that it is a valuable accession to the stock of those mechanical inventions by which the business of the farmer has of late years benefitted so largely. The machine, which is portable, weighs only 14 cwt., threshes easily and without waste, at the rate of 1 bushel in 40 seconds, turns out the grain perfectly clean and ready for market, and is manufactured in America, at a cost price of £23. It is thus about twice as light in draught as the lightest of our machines of the same description, does as much if not more work than the best of them, and, with much less power, dresses the grain, which they do not, and can be profitably disposed of at one-half, or at least one-third less money than our implement-makers charge. Any practical man who considers all these advantages, will appreciate at once their importance; yet they are secured by very simple arrangements, and by mechanical details which separately possess no very striking novelty. We build threshing-machines strong and dear enough to rob us of the benefit of all future improvements, and tremendously heavy either to work or to draw. The American farmer demands and gets a machine, which does not ruin him to buy, or his horses to pull about, which runs on coach and not wagon-wheels, and which, without breaking the heart of the power that drives it, yields the largest and most satisfactory results. Nothing, therefore, can better illustrate the difference in the mechanical genius of the two countries than this grain-separator as compared with its British rivals. Among the distinguishing features of Mr. Moffitt's patent may be noticed, that in threshing damp or wet grain he avoids "wrapping" or "choking," by using an ingenious open straw-carrier of wooden rods, connected by iron links, and driven by a cog-wheel, and that for cleaning the grain he has introduced a peculiar riddle, in which straws cannot lodge; a wire-rolling screw, through which grass, seeds, and other impurities fall; and a conveyer for carrying back the tailings. To push along the grain he employs the Archimedean screw, much in the same manner as in the flour-mills of this country,—a decided improvement upon the cup-lifting apparatus of our implement-makers, which they seem to feel a perverse pleasure in resorting to when they have the least excuse for doing so. The drum was yesterday driven by a 6-horse portable engine of Ransome's, at about 1,200 revolutions per minute; and, with that speed, the proportion of broken kernels was exceedingly small. The bars of the drum are armed with numerous wrought-iron teeth, which break the straw much more than we in this country consider desirable. Another objection taken to the machine is, that it does not give off the straw and the chaff separately in the most convenient and economical form. Taken altogether, however, this "separator" is a highly creditable specimen of the mechanical ingenuity of our cousins. It promises none of those startling results which drew such attention to the reaping-machines imported in 1851, but it may prove of the highest value if, through the formidable competition which it foreshadows, our implement-makers are induced to bring their scale of charges more within reach of the practical farmer's means, and to combine lightness of construction with the greatest possible efficiency and economy in the work done. It will be remembered that at the Exhibition in Hyde-park a number of American ploughs were exhibited, the dearest of which were not more expensive than the lowest priced British ploughs. That disparity, it was said (though we believe not justly), was more than counterbalanced by the inferiority of the article. But no such answer can in the present instance be given; and though Mr. Moffitt comes over to dispose of his patent, other American inventors will soon follow to work theirs. The British locksmiths, who have for ages been content to carry on their business by rule of thumb, will immediately find Mr. Hobbs turning out by machinery far better and cheaper locks than theirs. So the gunsmiths will find Colonel Colt bringing the same agent to bear in supplying the demand for his revolvers. It is no secret that Mr. Whitworth, of Manchester, has brought back from his recent tour, as a Royal Commissioner, through the manufacturing districts of the United States, a report filled with the most startling evidences of the progress which the mechanical arts are making there. The inventive genius of this country is about to be encountered on its own soil by a rivalry which it cannot too soon prepare itself to face; and one of the first classes that must meet this competition is the body of agricultural implement-makers. It will not be the fault of that pushing, bustling, restless advocate of improvement, the owner of Tiptree, if our Garretts and Ransomes escape the contest. The American reaping-machines found their way to his wheat crops, as if instinctively, in 1851. The American

threshing-machine comes now, and we are promised at no distant date a steam cultivator, the invention of an American, which is to deprive agriculture of her motto, and render it no longer necessary to "Speed the Plough."

It is not long since the *Times* published a conciliatory leading article, directed to the American press, which had pretty generally complained of the temper displayed in that journal, in the discussion of transatlantic affairs. In that article the past was referred to with apologetic explanations, and promises of future services were liberally advanced. Should any feeling of distrust or offence arise hereafter, the Americans were instructed to compare the treatment they received with that bestowed upon our own countrymen, and it was intimated they would then discover that the lenity was altogether on their own side. It is quite possible that the article now before us was put forth as a proof of the sincerity of those promises, and, as an example of the extent to which the *Times* is willing to go in flattering their cousins at the expense of their brethren. And it may further be said, that the spirit of the article favours this mode of accounting for its appearance. It just goes far enough in its adulation; a little more, and even an American might have suspected it to be banter.

Or, as the Parliament is holiday-keeping, and articles are now more thankfully received and more readily admitted, even by the *Times*, than when important speeches are to be had for the trouble of reporting them, may it not be that the production of some weak correspondent got carelessly sent to press, and accidentally brought forth with editorial sanction? This supposition, also, is supported by the character of the article. From the description the writer gives of Mr. Moffitt's machine, it appears pretty plain that his knowledge of agricultural machinery and machinists is exceedingly limited; so much so, indeed, that he seems to have become acquainted with the names of Ransome and Garrett for the first time, at the trial of which he writes.

But enough of these speculations. We conceive it is rather the province of the *Times* to publish facts of public interest than to characterise mechanical inventions; at any rate, if it assume scientific functions we have a right to demand that it offer praise only where it is merited, and that it stigmatise that alone which deserves reprobation. That partiality which in political matters is scarcely excusable, is intolerable in scientific decisions.

Now the machine which the *Times* considers to be of so excellent a character that it deserves to be held up as a type of American progress, and as threatening future aggression upon the territories of British invention and manufacture, has unfortunately several serious drawbacks, and such as are altogether avoided in machines already at work in our own country. For instance—it breaks and destroys the straw, and thereby uselessly consumes a large portion of the work of the engine; and it has to be provided with an arrangement for raising the straw, in order that it may be operated upon a second time; whereas the English machines completely separate the grain in one operation, and of course avoid the expense and trouble of a second process. Moreover, we have ample reason to believe that the *Times* has altogether misrepresented the cost of Mr. Moffitt's machine. A gentleman eminent as an agricultural implement-maker, after closely inspecting it, calculated that the cost of the materials alone of which it is formed, must be equal to what is represented in the above article as the entire cost of the machine when completed. And, perhaps the gravest fact of all, it has been represented to us, that this much-lauded American machine is but little better than a combination or mere modification of certain mechanical arrangements, first invented and patented in England by Mr. Garrett and Mr. Hart, and already in operation in their machines. As we have not yet had an opportunity of comparing the inventions, we cannot offer a decided opinion upon this point; we may nevertheless add, that should this prove to be strictly the case, it would occasion no surprise, as it would not be the first time that old English inven-

tions have been imported into their fatherland by American speculators, with all the bluster and importance that are associated with the most novel improvements.

In conclusion; we may say that English machinists need anticipate no such terrible rivalry as the *Times* is disposed to startle them with. It is quite true, that from the deficiency of manual labour experienced in America the inventive geniuses of that country are more intent on effecting improvements in the machinery employed in some branches of industry than the inventors of our own land; and therefore it would be but the most natural thing possible were more and greater improvements, connected with agricultural and other similar operations, originated in that country than in our own. And yet our experience hitherto convinces us that this is not the case; and we have to repeat again what has often before been said of that prosperous Republic,—namely, that she is still young enough to be enthusiastic, precipitate, and mistaken; that, like all young creatures, she has to learn wisdom from experience; to suffer much disappointment in accomplishing small results; and to assure her, that as her pretension and boldness diminish her genuine power will rapidly augment.

IMPROVED ROSE ENGINE.

The Committee of the Franklin Institute have made the following interesting report upon an improved rose engine, invented by Mr. P. N. Receveur, of Philadelphia:

That the improvements are numerous and important, and require description in detail, as follows:

In the engine employed for rose-turning, the following kinds of movement are required:—1. Revolution of the work for oval and circular cutting, with its modifications; or a reciprocating movement for right line or parallel cutting, with its modifications. 2. Lateral motion of the work or tool, to produce the wavy lines of a pattern. 3. End motion of the work towards or from the tool, to change the depth of cut at stated and regular distances. 4. A change (at will) of the connection between the work and the pattern, so that the angle between the two can be varied at any moment. 5. A feed-motion, to carry the tool in a lateral direction to given distances at stated periods required in producing a series of parallel or concentric cuttings. 6. A circular motion of the tool on its bed or rest, so as to vary the angle of the cut required in engraving the edges of watch-cases, &c.

The general form of the machine embodying the foregoing movements, and called the "rose engine," may be briefly described as consisting of a hollow mandril, on which are several narrow drums, whose pheripheries are scolloped or shaped according to different designs; passing through this mandril is another, solid, revolving in bearings or journals, and carrying in the front end chucks, &c., as in the ordinary lathe, and a cord-wheel at the other end, through which rotating movement is communicated in the usual way. The hollow and solid mandrils may be connected or disengaged at will, by a paul pressed by a spring into notches cut at regular intervals into the circumference of a plate at the back-end of the guide-drums. The tool is attached to a frame, which, in Mr. Receveur's improved engine, is pivoted on the table, and is free to vibrate laterally: its motion in this direction is governed by a point bearing against the guide-drums, and which being fixed opposite either of these, of course moves the tool in accordance with the pattern cut upon its edge; or when withheld from contact by lightening a spring, the tool describes either a circular, oval, or straight vertical line, as the case may be.

The solid mandril carrying the work is at liberty to move endwise, for the purpose of deepening or lightening the cut, the tool having no such motion; the shaft is pressed against a shoulder by a spring, and is reacted against this spring by a point attached to the tool-frame bearing upon wavy surfaces cut on each alternate guide-drum projecting from the others for the purpose. It is clear that the pattern on such guide-drum will regulate the depth of the cut. The vertical motion for right line work is produced by an eccentric, and a pentagraph lever movement connected with the same eccentric, enables any given pattern to be reduced in any ratio upon the work, giving rise to endless variety in the designs.

The important points of difference between the old machine and that of Mr. Receveur, are,—First, that the tool-frame is in his engine made moveable, and the mandril, with the work, rotates in permanent bearings, while in the old machine this condition of things is reversed; so that while in this latter the momentum of the moving parts vibrating is such as to preclude a great rapidity of motion, preserving the necessary uniformity and delicacy of

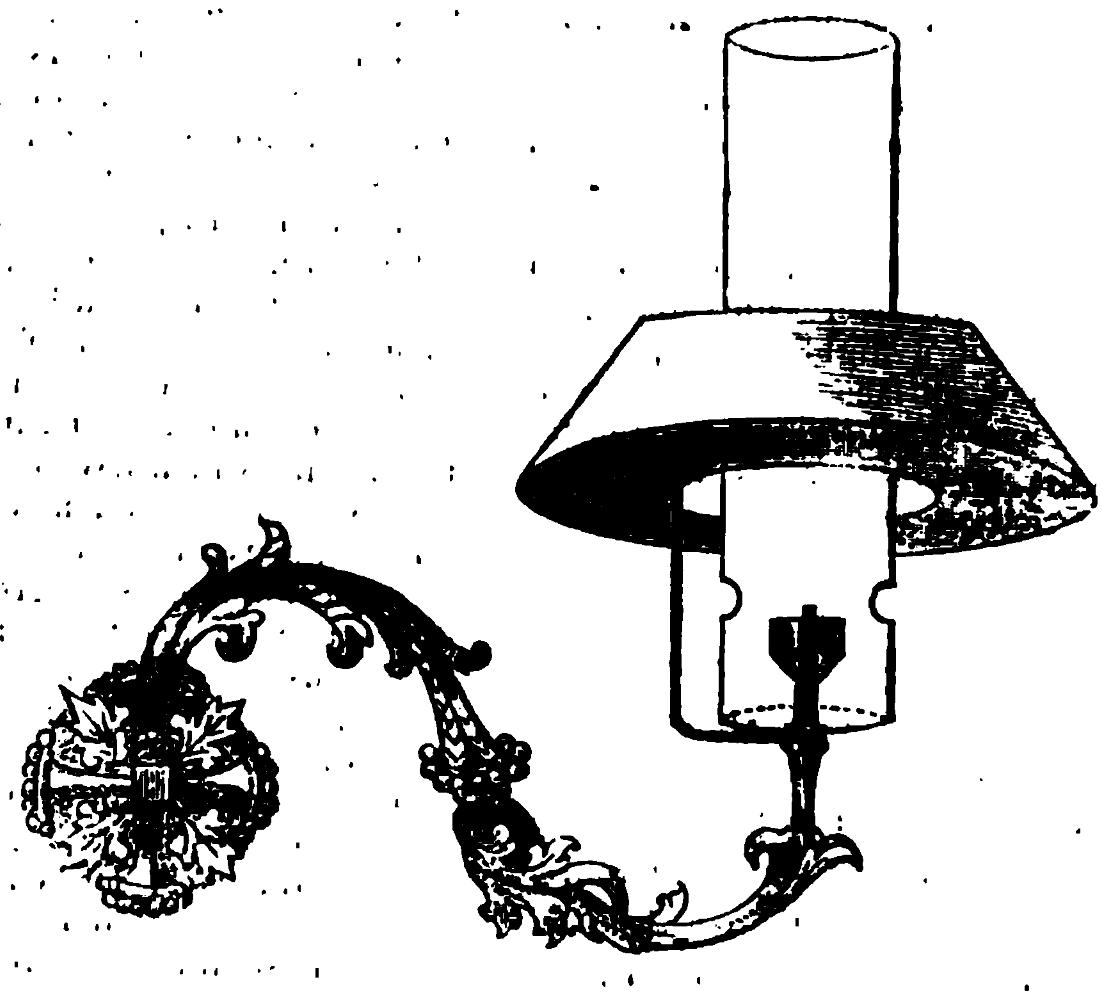
cut, in the engine of Mr. Receveur, by a very simple but ingenious modification, the speed at which work can be done is limited only by the skill of the operator. Secondly, that the old engine, in order to change the angle between the work and pattern, it is necessary to stop the rotation of the mandril; while the pawl before described as connecting the two is released, and after moving the drums to the desired point, again notched; while in Mr. Receveur's engine, a pedal arrangement is introduced, whereby the aforesaid paul is tripped by pressure of the foot; the point on the tool-frame is at the same time advanced, so as to press tightly against the drums, and so keep them from turning, while the operator continues the rotation of the mandril until it has arrived at the desired point, when the paul is again permitted to drop in. It should be observed that this cannot be applied to the old form of engine, on account of the vibrating pedestals supporting the drums, and the fixed tool-frame, &c., which of course renders it impossible to hold the drums while rotation of the mandril is carried on. This again permits of much greater rapidity in the performance of work. Thirdly, in the old engine the weight of parts in the pentegraph-lever arrangement is balanced by a weight suspended by a cord passing over pulleys; while in the new engine, they are connected to a spiral spring, like the main spring of a watch, placed beneath the table, and so arranged that equilibrium exists at any point in the vertical stroke. As the delicacy of the cut in right line work would be destroyed by any irregularity of motion, this must be a decided improvement.

Besides these principal points, there are numerous details of minor importance, but all tending to facilitate the execution of designs, which it is impossible to describe in the limits of a paper like this, and which, though perhaps they are movements already known separately in the arts, are believed to have been first applied by Mr. Receveur to the rose engine.

The Committee feel satisfied, after a close examination of Mr. Receveur's improved engine, that the features he has introduced are highly ingenious, and promote in a marked degree the objects desired,—viz., rapidity, accuracy, and variety of design; while they are believed to be original, and applied first by him to the purpose.

They therefore recommend that a Scott Legacy Medal and Premium be awarded to him for his invention.

BOGGETT AND PETTIT'S PATENT DIOPTRIC REFRACTORS.



It is well known to those who are acquainted with the principles of optical science that when light passes from one medium into another in any direction not perpendicular to the surface dividing them, that direction undergoes a sudden change, called refraction. The amount of this change of direction or divergence is depen-

dent on the angle at which the light enters the refracting medium, or the angle of *incidence* as it is called. To take advantage of this principle in utilising to the utmost extent the light derivable from gas and other burners of the descriptions in every-day use has been what Messrs. Boggett and Pettit have proposed to themselves, and that they have succeeded admirably admits of no question. The accompanying engraving represents one of their new dioptric refractors applied to a gas-burner. The instrument, it will be seen, consists of a glass ring of a prismatic section placed so as to surround the flame at such a height that all the lateral rays of light proceeding from it are intercepted by the ring, and, falling on its inclined exterior surface, are projected downwards and concentrated within the range of the refractor. This range will depend on the angles given to the interior and exterior surfaces of the prismatic ring, and can evidently be increased or diminished by making the angles between the sides and the base of the prism greater or less. The effect produced by the arrangement is such as could not fail to excite the attention of even the most cursory observer; and we predict for the invention a long and successful run. It is not indeed under all circumstances that it is desirable so to concentrate the light; but for all show purposes, and to enable delicate mechanical or other operations to be performed with artificial light, this is absolutely necessary; and there is no contrivance by which this can be done so effectually as by the present.

Messrs. Boggett and Pettit propose also, where a lighter refractor than one composed of solid glass is required, to make hollow refractors; that is, to combine a series of prismatic rings of much smaller sectional area and of gradually decreasing diameter, in the manner of a flight of steps; the exterior inclined surface being, however, always plain and the interior one-step fashioned. This arrangement is formed to produce an equally good effect.

A Dictionary of Arts, Manufactures, and Mines: containing a clear Exposition of their Principles and Practice. By ANDREW URE, M.D., F.R.S., &c., &c. Illustrated with nearly sixteen hundred engravings on wood. Fourth Edition, corrected and greatly enlarged. In two volumes. London: Longman and Co., 1853.

WE have been somewhat tardy in noticing these invaluable volumes, in consequence of having proposed to ourselves the preparation of an analysis of the new articles and other improvements contained in this edition. We find it, however, impossible to compress such an analysis into a form at all suitable to our pages; and therefore abandon the project, contenting ourselves with simply adding our praises, in a general way, to those which the work is sure everywhere to elicit.

Dr. Ure is well known to possess the qualities essential to an author of such a work to a very extraordinary extent. To a familiarity with the principles of the mechanical sciences he has added a rare and almost unexampled knowledge of the more subtle and difficult principles of chemistry, acquiring at the same time a familiar acquaintance with the methods of chemical and chemico-mechanical manipulations, these, his attainments, being all extended and perfected by the experience and observation of many years spent in the industrial districts of our own kingdom and of continental countries. It would be useless for us to enlarge greatly upon the fitness of the author for his task in these respects. There is, however, beside all this something more which should pertain to the writer of a work of this character; namely, a sense of the responsibility of the undertaking. We have had lately too many frivolous and precipitate individuals taking to themselves tasks of a magnitude quite beyond the measure of their powers; and that, too, no less in scientific than in general literature. The mischief resulting from this is so enormous that the practice cannot be too much reprobated. In proof of this, let any well-informed man ask himself how many works he can rely on as authorities, for example, upon any given scientific subject, and he will find but very, very few compared with the entire number of treatises upon it. The fact is, many men have no perception of the beauty, and consequently but little regard for the purity of science; and the cupidity of some publishers is great enough to induce them to print the most inexact and erroneous writing, provided the public will consent to purchase it, which is too generally the case.

This remark, however, serves to show how high an estimate ought to be set upon these volumes of Dr. Ure's, which consist chiefly of original and exact treatises written with so much accuracy and care that they may be universally resorted to as authoritative,—as indeed the former editions have been,—as well by artists and manufacturers as by British and foreign scientific

writers. The author has throughout the entire work kept most seriously before his mind the one object of promoting the best and most economical developments of the arts and manufactures, and has accordingly produced a work which altogether surpasses every other of its kind with which we are acquainted. One feature of the volumes particularly impresses us with the uncommon ability of Dr. Ure, and his peculiar fitness for the authorship of such a dictionary; namely, the judicious selections he has made of patented inventions for the purpose of continuing his account of the various improvements made in the arts and manufactures down to the present time. Such selections could only have been made by one whose knowledge of the minutest manufacturing details, and discrimination in estimating the most dissimilar novelties, are equally surprising.

The intrinsic worth of the work will be amply sufficient to insure it a large circulation; but we would nevertheless suggest to those who are immediately concerned in the propagation of sound and valuable knowledge throughout the community, that we know of nothing which would prove more favourable to their purpose than the general dissemination of these volumes.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

WILLIAM JOHNSON, of Lincoln's-inn Fields, Middlesex, civil engineer. *Improvements in machinery for combing wool, or other fibrous materials.* (A communication.) Patent dated April 23, 1853. (No. 983.)

Claims.—1. A general arrangement of machinery.

2. The use of a supplying apparatus or feeder, and a certain mode of actuating the same.

3. The mode of arranging and constructing right and left-hand combs, so that one describes a differential, and the other a rotary path.

4. The use of traverse or rotating apparatus for extending the longer fibres from the comb teeth.

5. A mode of combing and preparing fibrous materials by means of an endless chain of combs, or a circular comb of large diameter.

6. A certain mode of lubricating the comb teeth.

7. A certain mode of heating the comb teeth.

8. The use of circular cleaners or rotating brushes, for the removal of the shorter fibres and waste.

JAMES NAPIER, of Partick, Lanark, chemist. *Improvements in separating certain metals from their ores and alloys, and for obtaining certain products therefrom.* Patent dated April 23, 1853. (No. 984.)

This invention relates to the treatment of ores and alloys of copper and tin. The inventor arranges the substances in different classes, and operates upon these classes severally. For example; in dealing with sulphurets known, or found by testing to contain tin, he mixes them, as far as is practicable, in such proportions that the whole copper in the mixture shall range from eight to fourteen per cent. of the weight of the ores. He then calcines this mixture in the ordinary way, until the quantity of sulphur remaining in the ore does not exceed a fifth of the weight of the copper, when it is transferred to an ordinary fusing furnace, and a hundred-weight of coal is added to every ton of calcined ore. (The coal is employed simply in order to obtain clean slag.) The whole is then well-fused, has the slag skimmed off from it, and is run off into sand-beds. The alloy, "white metal," found at the bottom of the first and second beds being removed and reserved for another process, the remainder of the melt may be roasted, and refined as usual, but the inventor prefers to again calcine it for eighteen hours, and then to fuse it along with other ores containing no sulphur. The inventor describes other somewhat analogous processes, and claims the application of his improvements, not only to the ores and alloys of copper and tin, but also to all matters containing copper and tin.

GEORGE FERGUSSON WILSON, of Belmont, Vauxhall, Surrey, WILLIAM HENRY HATCHER, of Manor-street, Old Kent-road, Kent, engineer, and JOHN JACKSON, of Southville, Wandsworth-road, Surrey. *Improvements in apparatus for manufacturing moulded candles.* Patent dated April 23, 1853. (No. 985.)

This invention relates to the formation of glass moulds for making candles, and consists in giving a new form to the tips of the said moulds, and in an improved plan of cutting them off to their length; also in a new method of mounting the moulds in frames.

RICHARD JOHNSON, of Manchester, Lancaster, wire-drawer. *Improvements in machinery or apparatus for drawing wire.* Patent dated April 23, 1853. (No. 986.)

Claim.—The application to wire-drawing machines of a second horizontal drum, carrying suitable apparatus for drawing the wire.

EDWARD O'CONNELL, of Bury, Lancaster, surveyor. *Improvements in the mode or method of feeding infants and invalids, and*

in apparatus connected therewith. Patent dated April 25, 1853. (No. 987.)

The inventor describes an apparatus consisting of a vessel narrowed at the neck, and a cork or stopper fitted into it, through which a tube of glass or other suitable material passes, and extends nearly to the bottom of the vessel. To the outside of the said tube an artificial teat made of suitable material is connected; or the said teat may be attached to the extremity of a flexible tube connected with the former one.

CHARLES LEON DESBORDES, of Paris, France, engineer. *Improvements in instruments for measuring the pressure and temperature of air, steam, and other fluids.* Patent dated April 25, 1853. (No. 989.)

Claim.—The construction of instruments for measuring the pressure and temperature of air, steam, and other fluids, by means of a flexible diaphragm in combination with a plain, flat, or slightly cambered metallic spring in connection with an index, as described.

JOHN CHATTERTON, of Birmingham, Warwick, agent. *An improvement or improvements in covers for wagons, carts, and other vehicles.* Patent dated April 25, 1853. (No. 990.)

Claim.—Making the covers of wagons, carts, and other vehicles in two or more parts of different sizes, and arranging the said parts in such a manner that they may be made to slide within one another.

JAMES EMERY, of Preston, Lancaster. *Improvements in the construction of gigs, dog-carts, and other vehicles.* Patent dated April 25, 1853. (No. 993.)

Claims.—1. A general construction of vehicles, as described.

2. The mode of constructing vehicles with bodies of cane-work, or combined cane and wicker-work, as described.

3. The use in the cane-work, or combined cane and wicker-work bodies of vehicles, of intermediate metal stay-rods, for strengthening the bodies.

4. The mode of constructing the cane or basket-work bodies of vehicles with cane uprights, for strengthening the bodies.

5. The mode of constructing the cane-work or combined cane and wicker-work bodies with an internal lining of wood.

6. The strengthening of the shafts of vehicles by a cane-work binding.

WILLIAM JOHNSON, of Lincoln's-inn-fields, Middlesex, civil engineer. *Improvements in the means of retarding and stopping railway trains.* (A communication.) Patent dated April 25, 1853. (No. 994.)

Claims.—1. The use of a sliding-bar attached to the frame of railway-carriages, which bar is operated upon as described.

2. The connection with the sliding-bar above-mentioned of a combination of levers and other apparatus as described, or any mechanical equivalent thereof.

JULIAN BERNARD, of Guilford-street, Russell-square, Middlesex, gentleman. *Improvements in casting metals, and in moulding or forming other materials.* Patent dated April 25, 1853. (No. 995)

This invention consists in casting or moulding in a partial vacuum by extracting the air from the moulds.

ISAAC BRENTNALL SHEATH, of Birmingham, Warwick, gun-manufacturer *Certain improvements in fire-arms.* Patent dated April 25, 1853. (No. 996.)

This invention relates to fire-arms having revolving chambers.

Claims.—1. A mode of forming the frame of the revolving-chamber in two parts, and uniting them by screws.

2. A spring lever, by means of which the chamber may be both made to revolve and stopped, as required.

EMILE JOFFRIAUD, mining engineer, and RODOLPHE RIVIERE, miner, both of Paris, France. *Certain improvements in machinery or apparatus for washing earth containing gold extracted from the bottom of rivers or other waters.* Patent dated April 26, 1853. (No. 997.)

This invention consists in combining together the dredging-machine which raises the earth from the bottom of the water with that by which the earths, when so raised, are washed.

Claim.—"The combined form of mechanism for dredging and washing in its general feature, as described."

GEORGE KENNEDY GEYELIN, of Camden-town, Middlesex. *Improvements in the manufacture of white oxide of zinc.* Patent dated April 26, 1853. (No. 998.)

These improvements relate;

1. To a novel form of retort used in the process of sublimation.

2. To a particular arrangement of retorts in which they are placed in contact, so that the heat cannot pass up between them, but must first move along their under, and then over their upper surfaces before it passes away to the flue.

3. To a method of admitting jets of steam or vapour into the retorts, to facilitate oxidation.

4. To certain means of feeding the furnaces, in which the fuel is heated on a charge plate before it enters the furnace.

AUGUSTE and JEAN LE ROY, and EUGENE PAVY, all of Paris, France, manufacturers. *Improvements in the production of lace and other fabrics.* Patent dated April 26, 1853. (No. 1002.)

Claim.—The application of certain fibrous plants (viz., the yeuca gloriosa, the pine,

jute, and dwarf palm), either alone or combined with other fibrous substances, to the manufacture of various fabrics.

Uriah Scott, of Grove-street, Camden-town, Middlesex. *Improvements in the manufacture of tubular rods and rings for furniture.* Patent dated April 26, 1853. (No. 1003.)

The object of this invention is to deaden the sound consequent on using hollow metal rods and hollow metal rings; and it consists in filling, or partly filling the interior of them with sand, powder, or other granular matter or fluid.

Moses Poole, of the Avenue-road, Regent's-park, Middlesex. *Improvements in the manufacture of porcelain and like wares.* (A communication.) Patent dated April 26, 1853. (No. 1004.)

This invention consists in combining, in the formation of porcelain articles, the two processes now employed separately; viz., the forming the material of different thicknesses, and of ornamenting them by placing designs in colour upon them.

William Johnson, of Farnworth, near Bolton-le-Moors, Lancaster, manager. *Improvements in machinery for preparing and spinning cotton and other fibrous substances.* Patent dated April 27, 1853. (No. 1005.)

Claims.—1. The application of a compound lifting-rail to machines used in preparing and spinning cotton, &c.

2. The use of a loose washer, to diminish the friction between the under surface of the bevil-pinion and the upper surface of the bearing.

3. An improved spindle, bearing, and footstep, as described.

Frederick George Underhay, of Well-street, Gray's-inn Road, Middlesex. *Improvements in reaping and mowing machines.* Patent dated April 27, 1853. (No. 1006.)

"This invention consists of giving motion to a vertical axis by the movement of the carriage over the land. On the lower end of the vertical axis there are three cutters of a scimitar or other convenient shape, which revolving with the axis cut the crop, which after being cut is moved by means of revolving wings towards a platform, and beyond it.

George Ferdinand de Fouvielle, of Marseilles, France. *A filtering machine which acts under water, and is applicable to the filtering of all liquids.* Patent dated April 27, 1853. (No. 1007.)

This invention consists of a vessel of metal, perforated with small holes at its upper part, covered with a coarse fabric, and having in it successive strata, first of wool, sponge, or some such substance; then of pounded charcoal, mixed with small stones or grit; after this another similar to the first, and then one of pebbles, from which it passes through a tube into another cylinder, the part of tube within the second cylinder being perforated and surrounded with wool or other such material.

John Hetherington, of Manchester, machine maker, John Dugdale, Jun., and Edward Dugdale, both of Blackburn, machine makers, all of Lancaster. *Improvements in constructing and applying models or pattern for moulding, preparatory to casting iron, brass, and other metals for various purposes.* Patent dated April 27, 1853. (No. 1010.)

This invention consists of certain improvements on a method of forming models or patterns patented by Peter Fairbairn and John Hetherington in 1851. According to these improvements the pattern or model required is moulded in the ordinary manner, so that one half of it is one part of the box, and the other part in the other half. After the patterns or models have been removed, the box is put together again, the two halves being kept separate by a distance equal to the thickness of the plate required, and the sides of the box are then stopped before the molten metal is poured in.

The inventors claim the above mode of forming patterns; and also a method of applying patterns so as to produce smoothness of surface on the mould.

Richard Howson, of Manchester, Lancaster, engineer. *Certain improvements in weavers' harness.* Patent dated April 27, 1853. (No. 1012.)

Claims.—1. The construction of weavers' harness with woven borders, as described.

2. The attaching of each metallic eyelet to two threads, as described.

3. A mode of distributing the headle yarn over the headle bars in such manner as to form the leashes or rows of eyelets, as described.

4. The combination of the three above improvements in one harness.

Joseph Walter Gale, of Woburn-place, Russell-square, Middlesex, civil engineer. *Improvements in the permanent way of railways.* Patent dated April 27, 1853. (No. 1014.)

Claims.—1. A general arrangement and construction of permanent way, as described.

2. The use of plastic, and aluminous, and silicious earth for the manufacture of railway sleepers, such sleepers being composed of one or more pieces.

3. The use of bricks or tiles, separately or combined, for the construction of railway sleepers.

4. A mode of constructing earthenware

sleepers with passages throughout their entire length.

5. A peculiar construction of railway chair, as described.

6. A peculiar mode of securing chairs to their sleepers, as described.

7. Another peculiar form of chair, with its fastenings.

8. The use of lead, or other soft metal, for securing chairs to sleepers in the manner described.

WILLIAM JOHNSON, of Lincoln's-inn-fields, Middlesex, civil engineer. *Improvements in machinery or apparatus for marking, ruling, or ornamenting surfaces.* (A communication.) Patent dated April 27, 1853. (No. 1015.)

This invention consists of a carriage running on suitable guide rails, and fitted with a series of markers or pens arranged on holders or bars, so as, if necessary, to mark various widths with various colours.

GEORGE TURNER, of Bradley-terrace, Wandsworth-road, Surrey, and ROBERT HOLLOWAY, of St. James's-street, Hatcham New-town, Old Kent-road. *Improvements in the manufacture of unfermented bread, which improvements are also applicable to other purposes as a substitute for yeast.* Patent dated April 27, 1853. (No. 1016.)

This invention consists in combining certain materials, and thereby forming of them a substance to be used as a substitute for yeast; they are, tartaric acid, 120 parts, by weight; bicarbonate of potash, 144 parts; loaf-sugar, pounded, 30 parts; finest Patna rice, ground fine, 116 parts; and East India arrow-root, 30 parts.

GEORGE CRITCHLEY, of Cheltenham, Gloucester, whitesmith. *An improved apparatus for regulating the heat and supply of water in hot water apparatus.* Patent dated April 27, 1853. (No. 1017.)

This apparatus is composed of a cast-iron casing or box formed with holes, into which branch and main-pipes are fitted, and having double slides fitted to it, with openings formed in them corresponding to the openings in the case to which the branch-pipes are fitted. The slides have connected to them rods which work through stuffing-boxes, and have handles attached to their upper ends for the purpose of working the slides, and thereby regulating the quantity of water and heat which pass through them.

JAMES ANDREW BRUCE, of Coleraine, Londonderry, gentleman. *Certain improvements in the construction of hay-racks and other apparatus or apparatuses to contain fodder for horses and other cattle, and also in the method or methods of fastening horses or other cattle to prevent their over casting.* Patent dated April 27, 1853. (No. 1020.)

This invention comprehends—

1. A mode of constructing hay-racks, in which the rack is fitted with an inner plate on which the hay rests, and which is connected by cords with a weight or weights, by means of which it is raised as the hay on it is consumed.

2. An improved manger, the peculiarity of which consists in its being arranged so that only a small proportion of the food which it contains is presented at once to the horse or animal feeding from it.

3. A double sieve, for separating stones and other dirt from oats for feed.

4. A head-stall and tying-up rope, for the purpose of preventing over casting.

THOMAS CULPIN, of George-street, Greenwich, Kent, engineer. *Improvements in steam boilers, and in the appendages thereto.* Patent dated April 27, 1853. (No. 1021.)

A complete description of this invention forms the first article of our present Number.

WILLIAM REID, of University-street, Middlesex, electric telegraph engineer. *Improvements in apparatus for testing the insulation of electric telegraph wires.* Patent dated April 27, 1853. (No. 1023.)

This invention consists in arranging apparatus so as to subject coils of the coated wire first to exhaustion in a strong vessel, and afterwards to water-pressure, and then testing, by means of a galvanometer, whether the water has effected contact with the wire.

RICHARD JORDAN GATLING, of Indiana, United States, gentleman. *Distributing power to machine-shops, factories, and other places.* Patent dated April 27, 1853. (No. 1024.)

Claim.—"The employment of a main and stationary engine or source of power for the purpose of condensing air into reservoirs and pipes for distributing the same to secondary stationary engines;" also, the application of the exhaust or escape air for the purpose of artificial refrigeration, in combination with the above method of distributing power.

WILLIAM FREDERICK THOMAS, of Porchester-terrace, Bayswater, Middlesex. *Improvements in apparatus for sewing or stitching.* Patent dated April 27, 1853. (No. 1026.)

This invention relates to those stitching and sewing-machines in which are used two threads, one of which is conducted by a needle, and the other by a shuttle, or other thread-carrier, the stitching or sewing being effected by the interlooping of the threads.

Claims.—1. Certain means of regulating the distance travelled by the needle.

2. The application of springs to the shuttle-races.

3. So arranging and working the parts which hold the fabric whilst the needle is inserted, that the same may also effect the requisite traverse for the successive stitches, as described.

4. The application to the shuttles used in these machines of a wire, around which the thread first passes from the bobbin or spool, carried by the shuttle to the holes in the side of the shuttle, as shown.

5. A certain general combination of parts, by which the working levers act direct between the cams and the working instruments, or their carriers, and in straight lines, or nearly so.

ALFRED GEORGE ANDERSON, and JOHN BARKER ANDERSON, both of Great Suffolk-street, Southwark, Surrey, soap manufacturers. *Improvements in the treatment of certain saponaceous compounds obtained in the manufacture of soap.* Patent dated April 27, 1853. (No. 1027.)

Claims.—1. The decomposition of "niger" and the "fob," and residual soap, with which it is usually mixed, by treatment with sulphuric, muriatic, or other suitable acid.

2. The separation of the fatty and resinous matters obtained by the decomposition of "niger" and "fob" and residual soap, with which it is usually mixed into a solid and fluid portion by pressure.

3. The distillation of the fatty and resinous matters obtained, as above explained, and the separation of the distilled product into a solid and fluid portion by pressure.

4. The distillation of "niger" and the "fob" and residual soap without previous treatment with an acid, in the state in which it is taken out of the soap-copper, and the separation of the distilled product into a solid and a fluid portion by pressure.

5. The application of the more solid products obtained by the above treatment of "niger" and "fob" and the residual soap with which it is mixed to the manufacture of candles.

6. The similar treatment of other saponaceous compounds obtained in the various processes followed in the manufacture of common yellow or rosin soap to obtain like results as those obtained by the above methods.

JOSEPH HETHERINGTON, of Manchester, Lancaster, machine maker. *Certain improvements in reels for reeling or winding yarns.* Patent dated April 28, 1853. (No. 1028.)

The object of this invention is to facilitate the removal of the yarn or thread from the swift when a sufficient quantity has been wound upon it; and the invention consists in causing one of the bars of the swift to be hinged so that it shall fall towards the axis of the swift, and not towards a neighbouring bar.

JOHN HETHERINGTON, of Manchester, Lancaster, machine maker. *Certain improvements in machinery for combing cotton, wool, silk waste, flax, tow, and other fibrous substances.* Patent dated April 28, 1853. (No. 1029.)

This invention consists of the following improvements in the method of actuating Heilman's machine: 1. The introduction of a wheel having two rims of internal gear, the outer rim taking into a pinion on the end of the under detaching-roller, and the inner one into a pinion on the end of the calender or delivery-roller shaft: 2. In an arrangement for holding and working the top detaching or nipping-roller: 3. Making the journals of the fluted detaching-roller nearly of the same thickness as the fluted parts: 4. A mode of working the doffing-comb or knife and doffing-cylinder, and in driving the brush and combing-cylinder.

EDWARD BIRD, of Birmingham, Warwick, gentleman. *An improvement or improvements in the construction of certain kinds of vehicles.* Patent dated April 28, 1853. (No. 1030.)

Claim.—Constructing cabs, cars, mail-carts, tradesmen's carts, and other vehicles with the driver's seat situated at the back and on the right hand side thereof, and in such close proximity to the doors of the said vehicles as to give the driver command over the said doors without moving from his seat or losing command over his horse.

JAMES BERRY, of Horwich, near Bolton, and THOMAS BOOTH, of Chorley, both of Lancaster, machine-printers. *Improvements in machinery or apparatus for printing or staining woven fabrics and paper.* Patent dated April 28, 1853. (No. 1031.)

Claim.—The use of sieve-rollers, made of elastic substances, working in contact with the printing-rollers.

PETER FAIRBAIRN, of Leeds, York, machinist, and FERDINAND KASELOWSKY, of Berlin, engineer. *Improvements in machinery for drawing, roving, and spinning flax, hemp, and other fibrous substances.* Patent dated April 28, 1853. (No. 1032.)

Claim.—Subjecting slivers to the action of friction-surfaces on their passage from the feeding to the drawing-rollers, as described.

WILLIAM HURT SITWELL, of Sydenham, Kent, esquire. *An improvement in projectiles for cannon and fire-arms.* Patent dated April 28, 1853. (No. 1033.)

Claims.—1. Constructing such projectiles with an air-passage or throat through the centre thereof, and in the direction of their length with or without a wad or button.

2. The rifling of such air-passage or

throat by forming the same with one or more threads of a scew or spiral projection or recess fixed to or formed in or upon the air-passage.

3. Constructing war-rockets and projectiles generally with a passage or throat, as described, with or without a wad or button, and whether such passage be rifled or not.

Sir John Scott Lillie, Companion of the Most Honourable Order of the Bath, of South-street, Finsbury. *Improvements in roads, floors, footways, and other like surfaces.* Patent dated April 28, 1853. (No. 1034.)

This invention consists:

1. In the formation of blocks and slabs for constructing roads, floors, footways, &c., from broken stone, gravel, wood, iron, metallic substances, or other hard materials, conjointly and separately, and cause to adhere by means of bituminous compounds or other cements.

2. In covering the said or other paving-blocks with metallic sand, borings, filings, or other small pieces of metals.

3. In the application of boards or planks for supporting the said blocks, and also blocks of stone in ordinary use for paving purposes.

William Armand Gilbee, of South-street, Finsbury, London. *Improvements in apparatus for heating.* Patent dated April 28, 1853. (No. 1035.)

This invention consists in constructing a furnace with a peculiar arrangement of pipes, for the purpose of conducting air or water to the flame.

Thomas Revis, of Stockwell, Surrey, agricultural machinist. *Improved single seed drilling or dibbling machinery.* Patent dated April 28, 1853. (No. 1036.)

This invention consists in forming an instrument, the droppers of which are made to act by means of a lever or lifter, having its handle near the handle of the dibble, so that the mouth of the dropper is opened just wide enough to deposit a single seed. The operator can hold and work the dibbler with the same hand, and therefore may work two at once.

Robert Davison, of Mark-lane, London, civil engineer, and James Scott Horrocks, of Heaton Norris, Lancaster, gentleman. *Certain improvements in the means of conveying and distributing or separating granular and other substances.* Patent dated April 29, 1853. (No. 1040.)

This invention consists in a simple addition to the ordinary screw conveyer, the nature of which may be seen from the claim, which is. The application of ribs or blades to the screw, in order to cause it to turn over, or distribute the grain carried along by it.

Thomas Collins Banfield, of Queen-square, Westminster, Middlesex, gentleman. *Machinery for cutting or chopping roots, plants, or other similar substances.* Patent dated April 28, 1853. (No. 1041.)

Mr. Banfield's machine has a horizontal wheel armed with blades, and turning in an iron box. The blades, which are of the form of a segment of a circle, are placed in the spokes, and consequently work within, and not, as usual, at the circumference of the wheel. The roots or plants are fed into the machine through a hopper placed above it.

Thomas Collins Banfield, of Queen-square, Westminster, Middlesex, gentleman. *Drying and preserving vegetable or other saccharine plants.* Patent dated April 28, 1853. (No. 1042.)

The apparatus described and claimed by the inventor consists of a series of grates and flues, the number and distance from each other of which of course depend on the degree of heat required. The chimneys and flues are all connected with a hot-air chamber, the roof of which is composed of a grating of strong iron wire, or of light rod iron, tinned by preference. This drying roof is arched at a convenient elevation over a floor in a story above the flues, so that the substances to be dried may be readily spread and removed. Each hot-air chamber has a double set of stoves and chimneys, one on each side.

PROVISIONAL PROTECTIONS.

Dated June 16, 1853.

1464. Jules Alexis Adrien Dumoulin, of Paris, France. An improved instrument for measuring and tracing.

Dated August 1, 1853.

1794. Samuel C. Lister, of Manningham, York. Improvements in machinery for washing wool and hair.

Dated August 20, 1853.

1949. Alexander Cuninghame, of Glasgow, Lanark, North Britain, Ironmaster. Improvements in the manufacture or production of alkalis and their salts, or alkaline salts.

Dated August 30, 1853.

2006. Charles Goodyear, of Avenue-road, St. John's-wood, Middlesex. Improvements in the manufacture of waterproof fabrics.

Dated September 6, 1853.

2054. Alfred Sommerville and Charles Twigg, of Birmingham, Warwick. Improvements in pen-holders, and which said improvements are applicable to the manufacture of umbrella and parasol-sticks, cornice-poles, and other such like articles.

Dated October 1, 1853.

2242. Charles Coates, of Sunnyside, near Rawtenstall, Lancaster, mechanic, in the employ of Messrs. Butterworth and Brooks, of Sunnyside. Improvements in coupling-pipes and other articles, and in apparatus connected therewith.

2244. Edward Davies, of Bradford, York, machine-maker. Improvements in carrier combs to be used in combing wool, cotton, silk, flax, or other fibrous substances.

2246. John Hendry, of Glasgow, Lanark, North Britain, brick-builder. Improvements in ovens and apparatus for baking.

2248. Samuel Murland, of Castlewellan, Down, Ireland. Certain improvements in machinery for preparing linen yarn.

2250. Adolphe Drevelle, of Halifax, York, merchant, agent for Messrs. Ryo and Praxel, of Roubaix, France. Improved apparatus to be used in connection with looms for weaving. A communication from Messrs. Ryo and Praxel, of Roubaix, France.

2252. William Brown, of Bradford, York, mechanic. Improvements in apparatus used in washing wool and other fibrous material.

Dated October 3, 1853.

2254. John Wyncoll Baxter, of Mistley, Essex, ironmonger. Certain improvements in ship-building.

2256. James Coleman, of South-street, Finsbury, London, manufacturer. Improvements in the construction of compasses.

2258. William Henry Wilding, of Chesterfield-street, Middlesex, gentleman. Improvements in propelling machinery.

2260. William Crofts, of Derby-terrace, Nottingham park, manufacturer. Improvements in weaving.

Dated October 4, 1853.

2264. John Norton, of Cork, Ireland, Esq. Improvements in firing explosive compounds.

2266. Joseph Thomas Dodge, of St. Austell, Cornwall. Improvements in the formation and arrangement of and mode of rigging and working the sails of yachts, ships, and other vessels.

2268. Daniel Towers Shears, of Bankside, Southwark. Improvements in brewing.

2270. James Lee Norton, of Ludgate-hill, London, gentleman. Improvements in instruments or apparatus for measuring and indicating the distance travelled by carriages, and in the means of transmitting motion thereto from the running wheels.

Dated October 5, 1853.

2274. James Thomson Wilson, of Falkirk, North Britain. Improvements in the manufacture of alum.

2280. William Littell Tizard, of Aldgate, London, brewers' engineer. Improvements in thermometers and other like indicators.

Dated October 6, 1853.

2282. Julius Schönemann, of Great Portland-street, Middlesex. New constructions of weighing-machines. A communication.

2286. Alfred Ely Hargrove, of York, printer, and Ralph Richardson, of Hartlepool, Durham, engineer. Improvements in machinery or apparatus for printing.

2288. William Geeves, of the Caledonian Mills, New Wharf road, Caledonian road, Middlesex. Improvements in the manufacture of bricks.

Dated October 7, 1853.

2292. William Ellis, of Sheffield, York, artist. Improvements in the manufacture and in the ornamenting of China, porcelain, and pottery wares.

2294. James Ferguson, of Glasgow, Lanark, North Britain, and James Lillie, of the same place, tailors. Improvements in trousers and similar articles of dress.

2296. Joseph Porter, of the Salford Screw-bolt Works, Lancaster, engineer and tool-maker. Improvements in machines for drilling or boring metals or other substances.

2298. William James Matthias and Thomas Bailey, of Seckforde-street, Clerkenwell, Middlesex, clock-makers and copartners. Improvements in obtaining power by mechanical means.

2300. Robert James Corlett, of Monmorth, gentleman. Improved machinery for preparing or scutching flax and other fibrous materials requiring such an operation. A communication from Benjamin Delattre, of Setques, France.

Dated October 8, 1853.

2302. Alexander Edward Dudley Knox Archer, clerk to William Betts, of Wharf-road, City-road, capsule-manufacturer. Improvements in apparatus for applying metallic capsules.

2304. Henry Kraut, of Zurich, Switzerland, engineer. Improvements in stands for casks and barrels.

2306. Henry Dubs, of Vulcan Foundry, near Warrington, Lancaster, engineer. Certain improvements in the manufacture of wheels and tires, and also in the construction of furnaces employed in such or similar manufactures.

2308. George Lifford Smartt, of Enfield, Middlesex, chemist. Improvements in vessels for preserving leeches and fish alive.

2310. Henry Richardson Plimpton and James Leonard Plimpton, of Massachusetts, United States of America. A new and useful article of furniture to serve the purposes of a bedstead, a toilet-table, or a washstand and a writing-desk.

2312. Henry Clayton, of the Atlas Works, Upper Park-place, Dorset-square, Middlesex, machinist. Improvements in the manufacture of bricks and tiles.

Dated October 10, 1853.

2314. Robert James Maryon, of York-road, Lambeth, Surrey, gentleman. Improvements in the construction of anchors.

2316. George Fergusson Wilson, of Belmont, Vauxhall, managing director of Price's Patent Candle Company. Improvements in treating wool and fabrics composed of wool.

2318. George Fergusson Wilson, of Belmont, Vauxhall, managing director of Price's Patent Candle Company. Improvements in the manufacture of soap.

2320. Richard Archibald Brooman, of Fleet-street, London, patent-agent. Improvements in railway switches. A communication.

Dated October 11, 1853.

2322. James Knowles, of Eagley Bank, near Bolton-le-Moors, Lancaster, coal-proprietor. Improvements in machinery for regulating the velocity of steam engines and other motive-power engines.

2324. William Wilkinson, of Nottingham, frame-work-knitter. Improvements in bands, belts, and straps.

2326. William Beardmore, of Deptford, Kent, engineer, and William Rigby, of Glasgow, Lanark, engineer. Certain improvements in steam engines.

2332. William Muir Campbell, of Glasgow, Lanark, North Britain, furnace-builder. Improvements in earthenware kilns.

2334. William Henry Muntz, late of England, but now of Massachusetts, United States of America. A new and useful improvement in paddle-wheels for navigable vessels.

2336. John Francis Porter, of Bessborough-street, Middlesex, civil engineer. Improvements in the moulding of bricks and other articles of like materials.

Dated October 12, 1853.

2338. George Frederick Goble, of Fish-street-hill, London, civil engineer. Improvements in apparatus for signalizing and stopping railway trains.

2339. John Morison and Daniel Hurn, both of Norton Folgate. Improvements in the manufacture of nose-bags.

2341. Patrick Clark and Alexander Clark, both of Gate-street, Lincoln's-inn-fields, Middlesex, engineers. Improvements in revolving shutters and other closures for portable and other buildings.

2342. Thomas Smith, of Lambeth, Surrey, potter. An improved method of making pipes.

2343. Edme Jules Maumené, of Rheims, France, professor of chemistry. Improvements in the treatment of lignite or wood coal, and in obtaining various other useful products therefrom.

2345. Henry Mapple, of Child's-hill, Hendon, Middlesex, and Daniel Moore Mapple, of Sidney-street, City-road, Islington, Middlesex. An invention for electric telegraphic purposes, being an improved printing and signal electric telegraph, with electric alarum attached.

2346. George Bradley, of Castleford, York, gentleman. Improvements in stoppers or covers for bottles, and in the tools or apparatus for manufacturing the same.

2347. James Higgins, of Salford, Lancaster, machine-maker, and Thomas Schofield Whitworth, of the same place, mechanic. Improvements in machinery or apparatus for spinning and doubling fibrous materials.

2348. Charles Scott Jackson, of Cannon-street, City. Improvements in preserving seeds, potatoes, and other roots.

2349. John Gibson, of Bloomfield-road, Paddington, Middlesex, civil engineer. Improvements in fixing tyre on railway wheels.

2351. Richard Jones and Charles John Jones, both of Ipswich, Suffolk, engineers. Improvements in fire-arms.

Dated October 13, 1853.

2352. Henry Whitaker Butterworth, of Philadelphia, Pennsylvania, United States of America. An improved supplemental reflux valve for steam engines. A communication.

2353. William Muir Campbell, of Glasgow, Lanark, North Britain, furnace-builder. Improvements in potters' or earthenware kilns.

2345. Robert Popple, of Beverley, York, colour-manufacturer, and Henry Woodhead, of Kingston-upon-Hull, cotton-spinner. Improvements in machinery for slubbing, roving, and spinning cotton and other fibrous substances.

2355. John Elce, of Manchester, machine-maker. Improvements in machinery for preparing and spinning cotton and other fibrous substances.

2356. William Robinson, of Manchester, Lancaster, screw-bolt manufacturer. Improvements in machinery or apparatus for manufacturing or forging iron or other metals into screw-bolts, nuts, rivets, pins, studs, or other similar articles.

2357. Sir John Scott Lillie, Companion of the Most Honourable Order of the Bath, of South-street, Finsbury, London. Improvements in machinery for breaking stones and other hard substances.

2358. John Thomas Way, of Holles-street, Cavendish-square, Middlesex, professor of chemistry. Improvements in making and refining sugar, and in treating saccharine fluids.

2359. Abraham Pope, of Edgware-road, Middlesex, engineer. Improvements in furnaces.

2360. Joseph Piper, of Shoreditch, Middlesex, furnishing ironmonger. Improvements in apparatus for affixing adhesive stamps and labels.

2361. Charles Ludovic Augustus Meinig, of Leadenhall-street, London. Improvements in galvanic batteries.

2362. Thomas Grahame, of Hatton-hall, Wellingborough, Northampton. Improvements in building ships and other vessels.

Dated October 14, 1853.

2366. Andrew McLean, of Edinburgh, Midlothian, North Britain, chemist, and William Fraser Rae, of the same place, brassfounder. Improvements in apparatus for the manufacture of aërated liquids.

2367. William Ridgway, of Hanley, Stafford, earthenware manufacturer. Improvements in the construction of ovens and kilns.

2368. Mary Ann Davy, of Homerton, and Ann Taylor, of Islington, Middlesex. Improvements in the mechanical application of brushes.

2369. William Palmer, of Brighton, Sussex, ironmonger. Certain improvements in ventilating.

2370. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery for preparing and combing wool. A communication.

2371. John Farrell, of Stangate, Surrey. Improved means of insulating wire.

2372. The Hon. Frederick William Cadogan, of Hertford-street, May Fair, Middlesex. Improvements in the means of obtaining telegraphic communications applicable to armies in the field.

2373. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, London. Improvements in drying grain, flour, timber, fruit, vegetables, and other substances. A communication.

Dated October 15, 1853.

2374. Richard Gill, of Culcheth, near Leigh, Lancaster, manufacturer. Improvements in weaving single and double fabrics.

2375. Charles Coates, of Sunnyside, near Rawtenstall, Lancaster, mechanic, in the employ of Messrs. Butterworth and Brooks, of Sunnyside aforesaid. Improvements in and applicable to looms for weaving.

2376. Frederick Samson Thomas, of Cornhill, London, and Hook's Villa, Fulham, Middlesex, gentleman. Improvements in the construction of railway carriages.

2377. Benjamin Price, of Fieldgate-street, White-chapel, Middlesex, furnace-builder. Certain improvements in the means of or apparatus for reducing the quantity of smoke from the furnaces of boilers, coppers, pans, and other like vessels.

2378. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, and of Glasgow, North Britain, gentleman. Improvements in the manufacture of iron. A communication.

2379. Buckley Royle, of Manchester, Lancaster, manufacturer, and William Mac Ewan Chell, of the same city, salesman. A certain method of treating silk-waste arising from winding, warping, and weaving silk, and rendering it capable of being spun or otherwise employed.

2382. Thomas Woodcock, of Barnsbury-road, Middlesex, carver. Improved means of cutting, carving, engraving, piercing, or embossing metallic or other surfaces.

2383. John Peary, of Salisbury-crescent, Middlesex, smith. Improved means of preventing accidents on railways.

2384. Alexander MacDougall, of Manchester, Lancaster, manufacturing chemist. Improvements in the process of obtaining fatty matters from products arising in the manufacture of glue and other gelatinous substances.

2386. George Laurie, of New York, United States of America, dentist. Improvements in the manufacture of artificial teeth and gums. A communication from John Allen, of Cincinnati, dentist.

2378. Augustus Applegath, of Dartford, Kent, printer. Improvements in printing and embossing paper, with a view to prevent forgery.

Dated October 17, 1853.

2388. George Frederick Chantrell, of Liverpool, Lancaster, furnace-engineer. Improved apparatus applicable to the manufacturing and the revivification of animal or vegetable charcoal, and other useful purposes.

2390. John Macmillan Dunlop, of Manchester, Lancaster, engineer. Improvements in machinery or apparatus for pressing goods, applicable also to raising or removing bodies.

2391. William Scowcroft Low and John Barnes,

both of Rawtenstall, Lancaster, weavers. An improved shuttle to be used in looms for weaving.

2392. Capper Pass, of Bedminster, Somerset, metal-refiner. Improvements in the manufacture and refining of copper.

2393. Ellen Jones, of Palace-street, Pimlico, Middlesex, widow and administratrix of William John Thomas Jones, of Palace-street aforesaid, deceased. Improvements in steam-engine governors. This is the same invention as that for which letters patent were granted to her said late husband, on the 14th day of April last.

2394. Samuel Cunliffe Lister, of Bradford, York. Improvements in combing cotton and wool.

2395. John Palmer de la Fons, of Carlton-hill, St. John's-wood, Middlesex, gentleman. Improvements in apparatus for measuring and indicating the distance travelled by a carriage.

2396. Augustus Applegath, of Dartford, Kent, printer. Improvements in letter-press printing machinery.

Dated October 18, 1853.

2398. George Price, of Wolverhampton, Stafford, auctioneer. A new or improved method of communicating between the guard and driver of a railway train.

2399. George Louis Stocks, of Limehouse-hole, Poplar, Middlesex, ship-chandler. Improvements in ships' jackstays for masts and gaffs for fore and aft sails.

2400. Charles Peynaud D'Azene, of Essex-street, Strand, Middlesex, gentleman. Improvements in the method of rendering sea water fit for drinking and all purposes where fresh water is ordinarily used.

2401. Alphonse Doste Noel, of Chancery-lane, French advocate. Improvements in the manufacture of zinc white. A communication from Louis Pierre Geslin.

2402. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, and Glasgow, North Britain, gentleman. Improvements in raising or supporting heavy bodies for the better preservation of life and property. A communication from Yelland Foreman.

2403. Cornelius Nicholson, of New Broad-street, Middlesex, Esq., superintending director of the Great Indian Peninsular Railway Company. An apparatus for avoiding collisions of trains on railways.

2405. Isaac Hartas, of Wrelton Hall, York, farmer. Improvements in machinery for cutting turnips and other roots.

Dated October 19, 1853.

2408. John Wright Child, of Halifax, York, and Robert Wilson, of Low Moor Iron-works, in the same county, engineers. Improvements in regulating motive-power engines.

2409. John Norton, of Cork, Ireland, Esq. Improvements in firearms.

2410. William Roy, senior, of Cross Arthurlie, Renfrew, North Britain, calico-printer. Improvements in printing textile fabrics and other surfaces.

2411. Robert Shaw, of Glasgow, Lanark, North Britain, calico-printer. Improvements in writing-instruments.

2412. George Collier, of Halifax, York, mechanic. Improvements in the manufacture of carpets and other fabrics.

2413. William Little, of the Strand, Middlesex. Improvements in typographic printing.

2414. Charles Barraclough, of Halifax, York, mechanic. Improvements in the manufacture of carpets and other fabrics.

2415. James Barton, of Robert-street, Hampstead-road, Middlesex, ironmonger. Improvements in fittings for stables.

2416. William Watt, of Glasgow, Lanark, North Britain, chemist. Improvements in the preparation of flax and other fibrous substances.

2417. Thomas Thompson, of Much Park-street, Coventry, Warwick, engineer. Improvements in machinery for weaving carpets, coach-lace, and velvet.

2418. Alexis Dussuc, of Grove-place, Brompton, gentleman. An improved machine for digging and cultivating land.

2419. William Binns, of Leeds, York, cloth-dresser. An improvement in the treatment or finishing of woollen and worsted fabrics.

Dated October 20, 1853.

2424. John Beasley Burney, of Battersea, Surrey, superintendent of the City Steam-boat Company. Improvements in the prevention of smoke in steam boilers.

2426. Julius Augustus Roth, of Philadelphia, Pennsylvania, United States of America, chemist. Improvements in the bleaching and drying of fibres or fibrous materials, part of which improvements is applicable to the drying of woven and other textile manufactures.

PATENTS APPLIED FOR WITH COMPLETE SPECIFICATIONS.

2420. André Alexandre Beaumont, of Paris, France. A system of production of caloric, with or without combustible material. October 19.

2440. Frederick Albert Gatty, of Accrington, Lancaster, manufacturing chemist. Improvements in printing or producing colours on textile fabrics. October 21.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," October 28th*, 1853.)

1337. Hesketh Hughes and William Thomas Denham. Improvements in pianofortes.

1356. Hesketh Hughes and William Thomas Denham. Improvements in machinery for weaving.

(*From the "London Gazette," November 1st*, 1853.)

1312. William Smith. Certain improvements in the machinery for and method of making and lying down submarine and other telegraph cables, which machinery is also applicable, and is claimed for, the making of ropes and cables generally.

1386. George Carter. Improvements in the manufacture of white lead.

1388. John Walter Friend. An improved method of measuring and registering the distance run by ships and boats proceeding through the water, which is also applicable to measuring and registering tides and currents.

1401. Robert Booty Cousens. Improvements in the manufacture of casks or wooden vessels.

1402. Frederick Ludewig Hahn Danchell and William Startin. An improved mode of obtaining auriferous deposits from the beds of rivers and lakes, and from pits containing water.

1409. Claude Arnoux. A new system of towing and traction.

1435. Robert Hopkins. Improvements in machinery or apparatus for cutting and shaping cork, wood, and other similar substances.

1459. Edward Walmsley. Improvements in and applicable to steam engines.

1486. Edgar Breffit. Improvements in the manufacture of glass-house pots.

1515. Charles Cowper. Improvements in the manufacture of cards, or substitutes for cards, for the Jacquard loom. A communication.

1575. Auguste Edouard Loradoux Bellford. Improvements in the construction of submarine or subaqueous tunnels or ways. A communication.

1603. Alfred Vincent Newton. Improved machinery for printing. A communication.

1657. Martin Samuelson. Improvements in the manufacture of bricks and other articles from plastic materials.

1726. William Thorp. Certain improvements in machinery for finishing and embossing plain and fancy woven fabrics.

1794. Samuel C. Lister. Improvements in machinery for washing wool and hair.

1840. Auguste Edouard Loradoux Bellford. Improvements in the combination of glass with iron or other metals, to serve for the construction of floors, walls, roofs, or parts thereof, or of windows for buildings, and also of translucent pavements, lights for subterranean apartments, and for any purpose for which a translucent medium possessing great strength is desirable. A communication.

1948. William Vaughan and John Scattergood. Certain improvements in machinery, apparatus, or implements for weaving.

1949. Alexander Cuninghame. Improvements in the manufacture or production of alkalis and their salts, or alkaline salts.

1970. Thomas Hill and Alexander Thomson. Improvements in the manufacture of pipes or hollow articles from plastic materials.

1975. Charles Collyford Banks. Improvements in lubricators.

2006. Charles Goodyear. Improvements in the manufacture of waterproof fabrics

2052. James Davis and Robert Ramsay. An improved engine to be worked by steam, air, or water.

2053. Thomas Pope and Edward Bufton. Improvements in buttons, and which improved buttons they propose to designate by the name of "Buffalo buttons."

2211. Henry Winter. An improvement in trousers to supersede the use of braces, which improvement is applicable to other articles of apparel.

2242. Charles Coates. Improvements in coupling-pipes and other articles, and in apparatus connected therewith.

2244. Edward Davies. Improvements in carrier-combs to be used in combing wool, cotton, silk, flax, or other fibrous substances.

2252. William Brown. Improvements in apparatus used in washing wool and other fibrous material.

[illegible]4. John Wyncoll Baxter. Certain improvements in ship-building.

2258. William Henry Wilding. Improvements in propelling machinery.

2264. John Norton. Improvements in firing explosive compounds.

2274. James Thomson Wilson. Improvements in the manufacture of alum.

2288. William Geeves. Improvements in the manufacture of bricks.

2291. George Ellins. New or improved machinery for thrashing or separating the stem and husk from the grain or seed of wheat, barley, flax, and other plants.

2301. Francis Whitehead. Improvements applicable to lanterns, lamps, lamp-shades, and reflectors for reflecting, concentrating, or diffusing light.

2310. Henry Richardson Plimpton and James Leonard Plimpton. A new and useful article of furniture to serve the purposes of a bedstead, a toilet-table or a washstand, and a writing-desk.

2312. Henry Clayton. Improvements in the manufacture of bricks and tiles.

2313. William Edward Newton. Improvements in fire-arms and cartridges. A communication.

2316. George Fergusson Wilson. Improvements in treating wool and fabrics composed of wool.

2317. George Fergusson Wilson. Improvements in the manufacture of candles and night-lights.

2318. George Fergusson Wilson. Improvements in the manufacture of soap.

2319. Frederick Warner and John Shotton. Improvements in the manufacture of large bells.

2321. Hugh Lee Pattinson. Improvements in the manufacture of sulphuric acid.

2326. William Beardmore and William Rigby. Certain improvements in steam engines.

2334. William Henry Muntz. A new and useful improvement in paddle-wheels for navigable vessels.

2339. John Morison and Daniel Hurn. Improvements in the manufacture of nose-bags.

2354. Robert Popple and Henry Woodhead. Improvements in machinery for slubbing, roving, and spinning cotton and other fibrous substances.

2356. William Robinson, Improvements in machinery or apparatus for manufacturing or forging iron or other metals into screw-bolts, nuts, rivets, pins, studs, or other similar articles.

2359. Abraham Pope. Improvements in furnaces.

2361. Charles Ludovic Augustus Meinig. Improvements in galvanic batteries.

2370. William Edward Newton. Improved machinery for preparing and combing wool. A communication.

2375. Charles Coates. Improvements in and applicable to looms for weaving.

2377. Benjamin Price. Certain improvements in the means of or apparatus for reducing the quantity of smoke from the furnaces of boilers, coppers, pans, and other like vessels.

2379. Buckley Royle and William MacEwan Chell. A certain method of treating silk-waste arising from winding, warping, and weaving silk, and rendering it capable of being spun or otherwise employed.

2386. George Laurie. Improvements in the manufacture of artificial teeth and gums. A communication from John Allen, of Cincinnati, in America aforesaid, dentist.

2387. Augustus Applegath. Improvements in printing and embossing paper with a view to prevent forgery.

2394. Samuel Cunliffe Lister. Improvements in combing cotton and wool.

2396. Augustus Applegath. Improvements in letter-press printing machinery.

2403. Cornelius Nicholson. An apparatus for avoiding collisions of trains on railways.

2412. George Collier. Improvements in the manufacture of carpets and other fabrics.

2414. Charles Barraclough. Improvements in the manufacture of carpets and other fabrics.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed October 29, 1853.

756. George Shaw.
1051. Barnabas Barrett.

Sealed November 2, 1853.

1057. Henry Constantine Jennings.

1060. James Reeves.
1062. Auguste Edouard Loradoux Bellford.
1065. Auguste Edouard Loradoux Bellford.

Sealed November 3, 1853.

1074. George Frederic Goble.
1085. Edward Walmsley.
1133. George England.
1145. Gregory Kane.
1152. Alexander Chaplin.
1160. Richard Edmondson.
1178. Charles Pooley.
1186. Richard Archibald Brooman.
1194. Thomas Stephen Holt.
1203. John Drumgoole Brady.
1228. John Barsham.
1229. John Barsham.
1230. Edward Thornhill Simpson.
1233. John Oakey.
1237. Samuel Wright.
1247. Charles Cowper.
1259. Louis Gervais Dieudonné Buffet Delmas Ducayla.
1300. William Weatherley and William Jordan.
1316. Caleb Hill.
1324. John Henry Johnson.
1345. Maxwell Scott.
1374. Joseph Gyde.
1394. George Bazett Colvin Leverson.
1420. Samuel Frankham.
1473. Solomon Solomon and Samuel Mills.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
Oct. 17	3520	W. James	Bishopsgate-street	Rolling-bar for making nails.
24	3521	J. Bennett	Cheapside	Locomotive regulator.
26	3522	S. Green	Lambeth	Closet-pan.
27	3523	L. M. Flo'et	Finsbury	Syphon pipe.
,,	3524	H. M. Cumberland	Coleman-street	Bracelet page.
,,	3525	G. Chambers and Co.	Cheapside	Pocket companion.
28	3526	Devey and Dale	Shoe-lane	Ball-valve.
31	3527	Flanagan and Co	Liverpool	Æolian hat.

CONTENTS OF THIS NUMBER.

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Mechanics' Magazine.

No. 1579.] SATURDAY, NOVEMBER 12, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

MASTERS' PATENT REFRIGERATORS AND CHURNS.

Fig. 1.

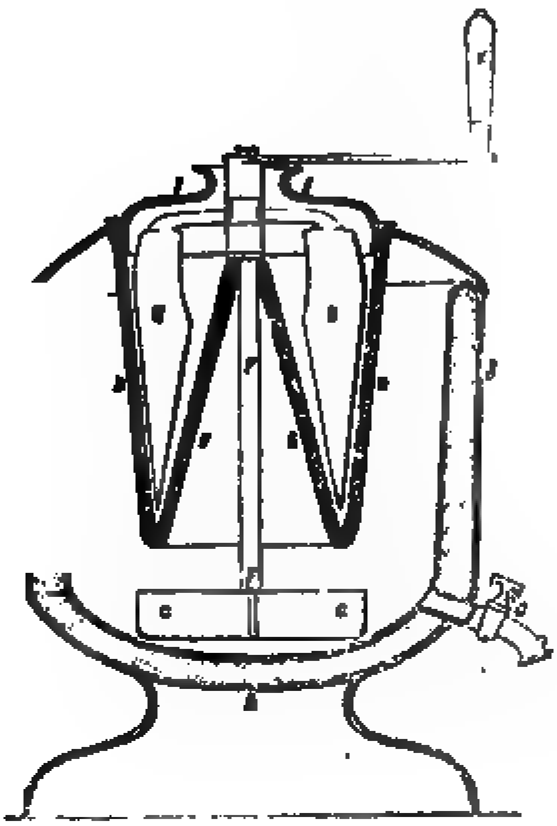


Fig. 2.

Fig. 3.

Fig. 4.

MASTERS' PATENT REFRIGERATORS AND CHURNS.

(Patent dated May 4, 1853.)

Mr. Masters, of Oxford-street, whose freezing-machines are already so well known and so extensively employed, has succeeded in effecting further improvements in the method of refrigerating liquids. His invention consists in constructing the inner vessel for holding the materials to be frozen, cooled, or churned in such a manner as to expose a large amount of surface to the freezing mixture, or to the liquid employed to facilitate the churning. Fig. 1 of the engravings annexed is a vertical section of a freezing-machine. A A is an exterior pail, or other suitable non-conducting vessel, for containing the interior parts of the apparatus. This vessel may be made of china, porcelain, or earthenware, in which case it need be of such thickness that the non-conducting substance can be dispensed with. Inside this vessel the inventor places a second and hollow vessel, B, for containing water or other liquid to be cooled or frozen, and provides a tap, C, passing through the exterior vessel, by means of which the freezing mixture may be drawn off. In some cases, however, where liquids are not required to be cooled or frozen, he dispenses with this second vessel. Inside the second vessel, when employed, or when the second vessel is not made use of, then inside the outer vessel is placed the rough ice or freezing-mixture into which a vessel, D, provided with an inner conical tube, E, is introduced. The mixture to be iced is placed in the interior of this freezing-vessel, D; and it will be seen that the freezing-mixture is brought in contact not only with the sides but also with the centre or conical tube, whereby a large amount of surface is exposed thereto, and the cream or other matter placed in the vessel, D, becomes frozen in much shorter time than in the icing-pails now ordinarily used. F is a spindle, which passes through the centre of the freezing-vessel, and is provided with an agitator, G, for churning or stirring the rough-ice or freezing-mixture. The spindle, F, is provided with a forked spatula, H, for agitating the cream or composition to be iced. I is a cover to the apparatus, through the centre of which the spindle is passed, which has fitted to it a crank-handle, K, or other suitable means for communicating rotary motion to the spatula, H, and agitator, G. When the freezing-vessel is removed from the pail, the pail or outer vessel forms a wine-cooler. Fig. 2 represents a vertical section of a freezing-apparatus, similar to the one just hereinbefore described; but in this apparatus the freezing-vessel, D, is so shaped as to form a mould for imparting an ornamental shape to the cream or other composition to be iced. The handle, K, instead of being placed upon the end of the spindle, is attached to one side of the cover of the freezing-vessel.

Fig. 3 is a further modification of the freezing-apparatus, in which the spatula, H, remains stationary, the requisite rotary motion being imparted to the freezing-vessel, D, by means of the handle, K. The agitator, G, for churning or stirring the rough-ice or freezing-mixture may also be formed with teeth upon its edge, similar to a spur-wheel; so that in some cases, where it may be desirable to use several of the freezing apparatuses, they may be so arranged that the agitators may gear into one another, whereby the requisite rotary motion will be imparted to the whole through the motion given to that which has the handle or handles attached to it. Fig. 4 represents this freezing-apparatus combined with a wine-cooler; the centre conical tube is also only carried partially up in the interior of the freezing-vessel, D. When these apparatuses are employed as a churn, instead of rough-ice or a freezing-mixture being placed in the outer vessel, the inventor places there warm water, and places the cream to be churned in the vessel, D.

THE LATE PORTSMOUTH CENTRAL SCHOOL.

The article on Admiralty Education, published in No. 1576 of our Magazine, has given great offence to Mr. Fincham and to his friends, one of whom subsequently volunteered a private statement of facts in order to show not only that the rumour referred to in that article was without foundation, but that Mr. Fincham had uniformly exerted himself in promoting the studies as well as the interests of the late pupils of the Central School, and had proved the sincerity of his professed regard for them by furnishing them with books, &c., at his own cost. This gentleman, moreover, alleged that Mr. Fincham could not have desired the appointment of Mr. Rawson to the Principalship of the Central School before its formation, as the latter was not appointed to Portsmouth Dockyard before the establishment of the school. As no good results could be expected from a private correspondence upon such a subject, a promise was made, on our part, that any statements which Mr. Fincham might choose to forward to us for publication in our Magazine, should be inserted, and thus have the same publicity given to them as our strictures had received. Mr. Fincham has not since then communicated with us, but a few days after a very violent article appeared (as we have but just discovered) in the columns of the *Mining Journal*, contain-

ing a statement *precisely similar* to that which Mr. Fincham's friend had previously proffered us. The silence of Mr. Fincham, and the appearance of that suspicious article, are the occasion of our reverting to the subject. And, if rumours offended so much, it is probable that the facts we shall now have to refer to will prove still more offensive; if so, Mr. Fincham must impute the blame of their publication to his allies who have occasioned it, and may well exclaim, "Save me from my friends!"

As is usual in such cases, our former remarks have been rashly and therefore wrongly interpreted. We have, however, chiefly offended by admitting to our pages the rumour that the appointment of Mr. Rawson to the Central School was desired by Mr. Fincham even from before its formation. To this the *Mining Journal* replies, and states that "that gentleman" (Mr. Fincham) "had never heard of Mr. Rawson till six months after the formation of the school, and only became acquainted with him by the circumstance of his appointment in the Dockyard." We scarcely know what to say to such a statement; it seems as confused as it is erroneous. We are, however, able to state the simple facts of the matter. When the first pupils who were to form the Central School were sent to Portsmouth, they were placed temporarily under the care of Mr. Rawson, who *was then, and had for some time been* the master of the Dockyard School. During the time they were in that position, Mr. Griffin—author of works on Optics, Dynamics, &c.—was named as the Principal of the school about to be established, and accordingly, we believe, visited Portsmouth; but, ultimately, did not take up the office. After some delay, Dr. Woolley accepted the Principalship; and almost immediately afterwards the school was formed, and the pupils commenced their studies. From this it plainly appears that Mr. Rawson *was* at Portsmouth Dockyard long before the formation of the Central School, and we may also add, that he was personally known to Mr. Fincham at the time that the appointment of a Principal was under consideration. It was then, rumour says, that Mr. Fincham was anxious to get Mr. Rawson appointed to the office; although, if that were the case, it certainly must have been more for his own gratification than for Mr. Rawson's benefit; but this does not appear to make it less probable that the rumour was true, when it is remembered that with Mr. Rawson for Principal, Mr. Fincham would have been able to assume the control of the Institution, whereas Mr. Griffin or Dr. Woolley would naturally enough prove their independence of such an authority. We shall not proceed further in this matter, but only add, that if Mr. Fincham did at that time wish for Mr. Rawson's appointment, it is quite certain that subsequent events naturally tended to increase such a desire.

Whatever was the cause of Mr. Fincham's unjust treatment of the late pupils of the Central School, it is our purpose now to show, from well-ascertained facts, that he did act towards them in a manner almost unexampled for its injustice; and having shown this, it will then be readily seen how far it is likely that his conduct led *indirectly* to the dissolution of the establishment; and that it did so is all we ever suggested, although the *Mining Journal* is ridiculous enough to endeavour to make it appear that we attributed that dissolution to the direct interference of Mr. Fincham; we could not, with our views of the extent of that gentleman's influence for the last year or two, have made so foolish a suggestion. But we have now to point out the unfairness which he manifested towards the Central School students, and in doing so we shall only refer to the following facts. Mr. Fincham was entrusted with the entire charge of their instruction in the various branches of practical shipbuilding. We shall not here enter upon the manner in which he fulfilled the trust, as that is not essential to the establishment of his unfairness, although it might serve materially to strengthen our position; we shall content ourselves with saying that every half year Mr. Fincham examined the pupils; and after having done this six times, and when the college studies of several of them were completed, without previous warning—without even the smallest timely suggestion by which they might be led to avert the decision, and without the least attempt on his part to remove the defects of their practical knowledge (of which, if they existed, he must have been all along conscious), by affording them better opportunities of acquiring information, and by himself seeing that suitable instruction was imparted to them—he totally disqualified them in his reports, and got them appointed to inferior and degrading positions; and that, too, at a most critical time. The consequence has been that hitherto they have not recovered, and are not likely soon to recover, the baneful influences of that act. It will not be surprising to find that Mr. Fincham was thenceforth considered to be injurious to the interests of the students; nor is it a proof of uncommon simplicity to suppose that his neglect and depreciation of them had an influence in the subsequent abolition of the College. With such facts before us, it is useless for the Mining, or

any other journal, to extol the good feeling and generosity of Mr. Fincham. We contend, that a friendly instructor would have warned his pupils if he saw them perilling their future prospects by neglect or otherwise, and have rendered them at least that assistance which he might be expected to afford them by virtue of his office; nay, we go further, and believe, that not to warn them fell nothing short of positive injustice. But we have neither space nor inclination to dwell longer upon this matter.

We cannot, however, conclude without adding a few general observations. We are certainly surprised to find the *Mining Journal* rushing out so uncouthly to the defence of Mr. Fincham, and still more surprised to find that it brings with it fallacies and not facts—bombast and not argument. In fact, the article reads as if some penny-a-liner had overheard the statement of Mr. Fincham's friend at our office, and straightway had reproduced it with all the garniture of his tawdry eloquence. In witness of this let the following be read:

"And it is obvious that the highest range of genius is that which bursts through the obstacle of inferior birth, and rises to the view of the world in spite of the absence of those adventitious aids of education and association which are early at the command of the higher classes.

"With respect to Mr. Rawson, if we are rightly informed, he is thoroughly deserving of, and competent to sustain, any advancement which he may receive. He is one of Nature's nobles; and, like Professor Hann, of King's College, has, by a natural talent for mathematical research, raised himself from the labour of the colliery to his present high position in the field of scientific literature." It is very natural, doubtless, for the writer of a *mining* journal to grow ecstatic while contemplating an intelligent collier; but we do think this is more than Mr. Rawson himself can admire! "One of Nature's nobles!" Really the *Mining Journal* is doing a strange and questionable thing. We shall have the price of coals higher than ever; for the collier-boys, instead of working, will be reading Hann, and devouring Tate, and indulging themselves with the secret prospect of the time when they shall know something of mathematics, and get a school, and be able to write a book (that few will read and none rely upon), and then figure in the *Mining Journal* as "one of Nature's nobles." Mr. Rawson will forgive us before he forgives the *Mining Journal*, doubtless; but, nevertheless, we will go no further. We admire, as much as any can admire, the industry with which he has improved his mind and possessed himself of some little mathematical knowledge. But we cannot see his claim to exemption from being classed with his fellow-dockyard schoolmasters. His chief published work was shown to be an utter failure in our own pages, and we must withhold our approbation from much that he has written in periodicals that have come under our notice. We confess our opinion is that his sphere is not literature, nor his chief quality originality.

But the *Mining Journal* is not quite the only paper that appeals from our judgment in these matters. A weekly country paper, which we shall not advertize by naming it, is exceedingly uproarious in its denunciations of what it calls indifferently the *Mechanics' Journal* and *Mechanics' Magazine*. For example, after quoting part of the article of the *Mining Journal*, it proceeds:—"Mr. Fincham is abundantly cleared of all party favouritism by the facts above stated, but such is our high opinion of Mr. Fincham's utterly unassailable integrity, and of Mr. Rawson's extraordinary qualification for the post he now holds, that we are quite sure that, if the charge were true, the whole of the scientific world, in regard to naval architecture, and the whole country at large in regard to their admiration of high *mathematical talent*, and the *practical application of the same*, could not but be grateful to Mr. Fincham, if through any direct or indirect means he had so managed that a gentleman so well qualified in every respect as Mr. Rawson is, should have been chosen to fill the situation he now holds." That is a pretty specimen of folly and extravagance, and contains, withal, a rather bold imputation of public immorality. The whole country at large "could not but be grateful to Mr. Fincham if, through *any direct or indirect means, he had so managed*," &c. We rather think the country at large is by no means disposed to ignore the distinction between just and unjust, wise and unwise, direct and indirect means. But we shall not allow such vulgar friends of Mr. Fincham and Mr. Rawson as these to lead us to extend our observations upon the merits or demerits of those gentlemen. We are disposed to think that they have been particularly unfortunate in their defenders, who really seem to be but too thankful to lay hold of even such names as theirs as an occasion of trying their unpractised hands in the composition of ridiculous and paltry panegyric. We only offer this one other suggestion: when complaining persons, for the future, supply materials for newspaper articles, it will be better for them if they can prevail upon the compilers to abandon alike scurrility and foolish adulation; each of which injures none more than him in whose service it is employed.

INSTITUTION OF CIVIL ENGINEERS.

Sitting of November 8, 1853.

The business of the evening was commenced, by the announcement of the dates of the ordinary Meetings of the Session; of the appointment of December 20th for the Annual General Meeting, for the election of the president, council, and officers; and of the 30th of May for the President's Conversazione.

The paper read was, "On the Speed and other Properties of Ocean Steamers, and on the Measurement of Ships for Tonnage," by Mr. A. Henderson, Assoc. Inst. C.E. The two subjects were combined, for the purpose of affording facility for their discussion.

After alluding to a paper brought before the Institution, in 1847, by the same author, in which the fallacy of using registering tonnage and nominal horse-power, as the index of the capabilities, or speed of steamers, was shown, by a comparison of their relative proportions and elements of resistance with the steam-power employed, the present paper referred to a tabular form, containing copious details of dimensions and of general information, as to the form, proportions, and speed, realised by ocean steamers, compiled from documents, emanating from the Department of the Surveyor of the Navy, and from returns made to Parliament, by the Post-office and Admiralty; showing that, between the years 1845 and 1851, on an aggregate mail service of 1,271,000 miles, the speed realised only averaged 7·945 knots per hour, which was far short of the speed generally supposed to be maintained by mail steamers; the highest speed being 8½ knots per hour, between Marseilles and Alexandria, by H.M. mail-packets, and the lowest 7¼ knots per hour, between Ceylon and China, by contract steamers.

Reference was then made to a tabular statement, published by the Committee on Steam Communication with India, showing the station of each steamer, including six packets of the Indian navy, running upwards of 325,000 miles, at a speed of 8·082 knots per hour, and eleven contract steamers of the Peninsular and Oriental Company, running above 533,720 miles, and averaging 7·972 knots per hour. By the same Table the speed of the iron steamer *Pekin* was shown to be 7·733 knots per hour; the older timber steamers, *Lady Mary Wood* and *Braganza*, realizing only 7·378 knots and 7·249 knots per hour respectively.

Some observations were offered on the various proportions, forms, and resistance of ocean steamers, and the difficulty of obtaining a fair criterion of relative efficiency; with suggestions that the information might be obtained by recording the particulars required in the columns of a Table, similar to one which was exhibited, from which it appeared that the proportions of vessels varied from five and a quarter to eight times their breadth to their length. That the length of five steamers realizing 8½ knots per hour, averaged less than six times their breadth, while that of those which realized less than 7½ knots averaged upwards of seven and a half times their breadth.

Reference was made to the *Orinoco*, one of the largest new steamers, the particulars of which afforded much useful information, and which, if similarly collected from other sources, and deposited in the archives of the Institution, would be most valuable, as the subject was daily becoming of greater interest and importance.

The second part of the paper was "On the Measurement of Ships."

By the old law, or builders' measurement, the length (less three-fifths of the breadth) multiplied by the breadth, and the product by half the breadth, and divided by 94, gave the registered tonnage. By an Act passed in 1836, and amended in 1845, a rule was adopted, based on the internal measurement of eleven breadths, and four depths, taken at three sections, the divisor 3,500 giving the registered tonnage.

It was contended that the present register of particulars, by omitting the depth, gave less information than the old register; that calculations of tonnage deduced from internal measurement must show discrepancies of ten, or even fifteen per cent. between the computed tonnage of timber and of iron ships of the same size or external bulk; therefore it had become necessary to introduce a method of computation, deduced from both internal and external measurement, so as to combine the capacity for stowage, and the weight or the load, and the displacement. The principle being to ascertain the external bulk and internal space in cubic feet, and to deduce from the mean of these, by the use of a factor 30, 31, or 32, a register of tonnage approximating to the old law, chiefly for statistical purposes. The external and internal dimensions in cubic feet giving the only correct definition of the size, capacity, and resistance of a vessel.

In 1849, the Tonnage Committee, including Mr. Parsons and Mr. Moorsom, reported, that the equitable basis for charges was, that of the entire cubical contents, measured externally, adopting a mode originated by Mr. Parsons, of taking curves of areas of vertical sections, measured externally to the height of the upper deck; but these views were opposed, on the ground that iron vessels had much greater internal

capacity than timber vessels of the same external measurement; and also on the assumption, that light, or measurement goods, exceeded in amount heavy goods, or dead weight; whereas, from the trade returns, No. 51, of 1850, it appeared, that of the total imports and exports amounting to 10,760,217 tons, there were 7,483,214 tons of heavy goods, and 3,277,003 tons of light merchandise, thereby showing, that a system combining external and internal measurements, would be the most equitable.

Mr. Moorsom proposed a mode of computing the internal capacity, without the aid of diagrams, or curves of areas, and of ascertaining the tonnage by dividing by 100 as more convenient. This new rule did not, however, give the burthen the vessel would carry, but merely the tonnage for an assessment of dues.

From both these propositions the Author of the paper dissented; considering it inexpedient to alter the present law, except to obtain a rule, that should secure a correct mensuration and description of all kinds of vessels, so recorded on paper as to give the size, form, and construction of the vessel. The plan he proposed would afford the means of correcting the measurement of sections, and would give facilities for forming a scale of displacement, and curves of internal areas, from which the weight of cargo, or capacity for light goods could be obtained. Vessels being sold, and often freighted at a price based on their bulk and capacity, and the materials, fittings, masts, sails, and engines being all more or less regulated by these two qualities, it was expedient they should both be recorded on the the Builders' certificate, to be used whenever required by the officers usually employed in surveying ships, provided the mode of measurement and record was properly defined, exemplified by plans, and authorised by law.

The practicability of effecting this was shown, by the exhibition of a *pro formâ* certificate of survey of a vessel, such as was proposed to be substituted for the usual Builders' certificate, now required for registry; the directions for the measurement of sections and for striking the curves of areas, were given, and exemplified by diagrams, together with the rule and the processes of computing the external bulk and the internal space; the displacement and registered tonnage being thus given for three several vessels, built of timber only, of wood planking and iron frames, and entirely of iron; showing greater internal capacity of the two latter as compared with the former.

By a specification of the materials for these three vessels, the weight of the hull of a timber ship was shown to be 184 tons, that of iron 148 tons, and of iron frames and wood planking 158 tons,—the latter being represented as an arrangement of materials by which the author proposed to obtain the lightness and capacity of an iron ship, without the danger of corrosion and of undue action on the compasses.

This proposition, like Mr. Moorsom's, had been submitted to the Board of Trade, with the view of suggesting the reorganisation of the Tonnage Committee, and the addition of members connected with shipping and with scientific societies, so as to promote free discussion and the diffusion of information, and to obtain experience, conducing to the improvement of mercantile marine, fishing-boats, and life-boats.

The necessity for the co-operation of all engaged in maritime enterprise was urged from the experience of the limited improvement hitherto made in fishing-boats and life-boats, reference being made to the circumstances of the failure of the prize model life-boat, concluding with a proposition, that the Admiralty should provide each coast-guard station with one of their model life-boats, and that a Mercantile Marine Association should be formed, for the prevention of loss from shipwreck, an end which could only be attained by the improvement of the forms and fittings of vessels and boats.

ARTIFICIAL PRODUCTION OF DIAMOND POWDER.

M. Despretz has made two communications to the Académie des Sciences, upon carbon. In these he states, that placing at one, the inferior pole of a voltaic battery, a cylinder of pure charcoal (its purity being secured by preparing it from crystallized white sugar-candy), and at the superior pole a bundle of fine platinum wires, so arranged that the charcoal was in the red portion of the electric arc, and the platinum in the violet, he found the carbon volatilized and collected on the platinum wires in a changed state. In these experiments the current has been continued during a month in activity, and the powder collected on the wires has been found to be sufficiently hard to polish rubies with great rapidity, and when burnt it left no residue. M. Despretz asks himself,—Have I obtained crystals of carbon which I can separate and weigh, in which I can determine the index of refraction and the angle of polarization without doubt? No: I have simply produced, by the electric arc, and by weak voltaic currents, carbon crystallized in black octohedrons, in colourless and translucent octohedrons, in plates also colourless and translucent, which possess the hardness of the

powder of the diamond, and which disappear in combustion without any sensible residue. A similar result has been obtained by decomposing a mixture of chloride of carbon and alcohol, by weak galvanic currents.—*Athenæum.*

GOVERNMENT PREMIUMS FOR CHRONOMETERS.

To the Editor of the Mechanics' Magazine.

SIR,—In the supplemental volume of the Illustrated Catalogue of the Great Exhibition, it is stated that a reward of £300 is annually given for the best chronometer on trial at the Royal Observatory, Greenwich, and, as similar statements are not unfrequently published, I beg to correct the mistake. The rewards that have been given for chronometers by Government consists of two classes; first, those which have been given for improvements in the principle, viz., to Harrison, Arnold, Earnshaw and Eiffe; and secondly, those which have been given for excellent performance of individual chronometers.

The trials in which the latter class of rewards have been given were those which commenced in 1823, and ended in 1835. In this period two or three sums were annually awarded for the chronometers which exhibited the smallest errors, but there was no rule that any new principle should be introduced in order to obtain the prizes; indeed, during the thirteen years which these trials lasted, no improvement in the principle was made, although, after the first year, there was a marked superiority of performance in the chronometers from their adjustments having been more carefully attended to.

Annual trials are still continued at the Observatory, which are of a far more searching character than those in which the prizes were given, as the chronometers are now placed outside the building during the coldest weeks, and inside a chamber heated to about 100° Fahr. for the opposite extreme, in order to test the improvements in the compensation for temperatures which have since been made; but the only reward which is now given for excellent performance, is merely the purchase by the Admiralty of one or two of the first chronometers in each trial: the price awarded is, however, sometimes less than that which most foreign governments pay for chronometers in the ordinary way.

Had the statement contained in the Illustrated Catalogue been correct, the Admiralty would have been indebted to me £1,200 since 1848, for the four years in which my chronometers have occupied the first place in the trials; and should the annotator be of opinion that his statement in the catalogue is correct, I shall be happy to allow him a liberal commission if he will obtain these arrears for me. For my own part, I have been in vain endeavouring to obtain payment of the reward which the Admiralty, in 1845, led me to expect would be given for my improvement in the compensation when the principle should be fully established by repeated trials at the Greenwich Observatory.—See a Parliamentary Return just published, No. 1006, obtained by Sir George Pechell last year.

I am, Sir, yours, &c.,

E. T. LOSEBY.

London, November 6, 1853.

[We willingly give insertion to the above letter of our correspondent, not merely because we are desirous that the error he there refers to should be publicly corrected, but also on account of our anxiety to express total dissatisfaction with the treatment he has received from the Board of Admiralty, which certainly has been such as to excite the strong disapprobation of all who are in any way concerned with the prosperity of science, and with the rewards of those who foster and improve it. Of course we are bound, in all matters which affect personal interests, to proceed upon evidence, and to base our conclusions entirely upon well-ascertained facts. We have before us copies "of all Correspondence and Papers relative to Improvements in Chronometers received by the Board of Admiralty, the Hydrographer, and the Astronomer Royal, since the 25th day of July, 1849," printed by order of the House of Commons, dated 4th July, 1853, and upon these papers alone we shall rely for the facts upon which to form a judgment in the present case.

The Astronomer Royal, in a letter dated 16th August, 1852, discusses the matter under three different heads, and we think we cannot better lay the facts before our readers than by following the order he has there adopted, viz.—1. The merits of Mr. Loseby's invention; 2, the abstract propriety of giving to Mr. Loseby a reward; 3, the implied promise of reward to which Mr. Loseby refers. First, then, with regard to Mr. Loseby's invention, we need do no more than quote two sentences from the letter of Professor Airey, just referred to. He there says: "I consider these experiments," (that is, special experiments intended to test Mr. Loseby's improvements,) "to have incontestibly proved the success of Mr. Loseby's invention;" and, again, "I consider it therefore as placed beyond doubt, that the success of Mr. Loseby's principle is proved, and that the *general excellence* of his chronometers is established." Nothing can be more definite or more decided than these express declara-

tions of established superiority; and we therefore proceed at once to notice, secondly, the abstract propriety of giving Mr. Loseby a pecuniary reward. It is well known that Mr. Eiffe was the first who directed attention to the error, which Mr. Loseby's invention is intended to correct, and, moreover, that he was also the first to apply a construction to the correction of it; and therefore it is certain that Mr. Eiffe's gratuity was awarded to him most justly and consistently. But we go further than this, and conceive that since Mr. Loseby's invention is much more effectual than Mr. Eiffe's in correcting the same injurious error, that it were but just and natural that Mr. Loseby's should also receive a corresponding remuneration. Professor Airy, however, thinks otherwise, and urges this plausible objection: "If the principle is once laid down that money rewards may be expected for secondary steps following the primary inventions of others, the Government will be overwhelmed with demands for reward." We discover in this suggestion more ingenuity than fairness — a larger effort to say pleasant words to the Government than to do justice to Mr. Loseby. It is plain the writer insinuates that the inventions of Mr. Loseby and Mr. Eiffe are similar in their character; whereas there is scarcely any other resemblance between them, than that they are both directed to the same end. But we have not space, and perhaps it is not necessary, to analyse the sentence at length, and so pass on to consider, thirdly, the implied promise of reward to which Mr. Loseby makes reference.

It appears that in their reply to a proposal made to the Board of Admiralty by that gentleman, their Lordship's secretary wrote as follows: "Before they can venture to bestow a reward for the same by any grant of public money, my Lords require further proof of its practical utility by subsequent trials at the Royal Observatory." A defendant's counsel might attempt to rescue an indigent client from the pledge tacitly contained in such words; but that a gentleman could seek to deliver himself from the obligation we can scarcely believe; especially could he not do so after they had been understood as a promise, and made the occasion of future labour and expense on his part to whom they were addressed, as was the case with Mr. Loseby, who reminds their Lordships "that had he not possessed other sources of income, and met with more encouragement from foreign governments than he has received from his own, he would long since have been obliged to relinquish his labours in the field of horological improvement for a more remunerative occupation." The Astronomer Royal refuses to express himself upon this matter, and refers it "to the *judgment* of my Lords Commissioners of the Admiralty." It would have been more consistent, although certainly less prudent, to have submitted it to the *honour* of their Lordships. By so doing, he might probably have aroused a drowsy feeling in their noble breasts. It is certainly due to the reputation of the members of the Admiralty Board that so equitable a claim as Mr. Loseby's be satisfied; and it is further due, as we have already intimated, to the interest of science and scientific men.

There are some persons, and some commissions, who treat honourable demands and cringing importunities with the like contempt. Boards of Admiralty are not unfrequently of this class. They first affront a claimant with neglect, and then resent the repetition of his demands if he is persevering enough to continue to urge them. The only chance for such a person is that some member or members of the Board may be sufficiently intelligent to understand his claims, and honest enough to recognize and meet them. We have much hope that Sir James Graham and Mr. Osborne will be found to be of this character, and to act accordingly towards so eminent an horologist as Mr. Loseby. We have no knowledge of that gentleman but a public one, and have thus commented upon the subject of his letter from the same motives as we hope will lead the press generally to require from the hands of a public commission, that honour and that justice with which such bodies should always cherish, and never impede great scientific improvements.]

SOUNDING INSTRUMENTS.

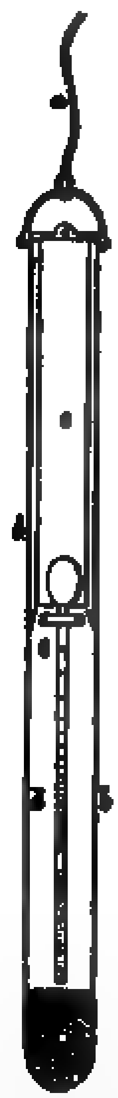
To the Editor of the Mechanics' Magazine.

Sir, — Having read in the *Mechanics' Magazine* a letter describing an instrument proposed to be used for ascertaining the depth to which a weight, attached to a sounding-line, has descended in the sea, I take the liberty of sending you a sketch of an instrument which I had constructed, and used, some months since, for the purpose of measuring the amount of compression to which air is subject when lowered to various depths under water, and which, from its simplicity and correctness, may perhaps be found to act as an indicator of the depth of soundings, better than an instrument fitted with piston and spring.

It consists of a straight metal cylinder, open at the lower end only, to which end a perforated cap is fitted, having in its centre a socket into which the end of a straight rod of hard wood is fixed; the rod being

the length of the cylinder and having a scale marked upon it. When the instrument is lowered into the sea, the water enters at the lower end of the cylinder and wets the wood-rod, which, on being withdrawn, shows distinctly to what height the water has risen. This contrivance I have used with success, and the accompanying sketch (fig. 1) will, I hope, sufficiently explain

Fig. 2. Fig. 1.



its construction. *a* is the sounding-line; *b*, the cylinder; *c*, the perforated cap, which screws on, so as to be removable at will; *d*, the wooden rod with a graduated scale; and *e*, the sounding weight.

For the more ready reading off, the cylinder might be of transparent glass, and the rod have a ring of buoyant material sliding upon it, with just sufficient grasp upon the rod to retain it at the height to which it is raised by the water; a small thread being attached to the ring for drawing it down to the lower end of the rod after the depth of sounding has been registered. I prefer having the lower end only of the cylinder open, as the slightest escape of compressed air through a joint at the top, would render its observations incorrect.

I should have communicated earlier, but the article alluded to only came under my notice this week.

I am, Sir, yours, &c.,
EDW. COCKS.

135, High-street, Southampton,
Nov. 5, 1833.

P.S. In continuation of the subject of deep-sea sounding, in the preceding letter, I beg further to illustrate, by means of the accompanying sketch, the manner in which I think it would be desirable to construct an instrument for that purpose, if intended to serve in place of the ordinary lead line.

As it is highly important that an instrument for sea use should be strong, easily understood by seamen, and not liable to derangement, I think that shown at fig. 2 would combine those requisites, and therefore submit it for consideration.—*a* is the sounding line and handle secured to an outer frame of brass rods, *b b*; *c*, an inner cylinder of brass, 16 inches long and 2 inches in diameter, closed at top, with perforated plate at bottom, forming a guide for the spindle, *d*. This spindle has a hollow ball attached to its upper end, and is marked with a scale in fathoms; it has also an indicator composed of two small strips of brass, the ends of which are riveted together, and the space between the rivets opened out to admit the spindle. The indicator slides on the spindle as the latter rises, and remains at the point to which it is thus drawn, so as to show, by its position on the scale, the amount of compression to which the air in the cylinder has been subjected.

It will be readily understood, that when the instrument is lowered into the water, the hollow ball and spindle will float on the surface of the water admitted within the brass cylinder, and will rise in exact proportion to the depth which the instrument has descended. The indicator being prevented by the guide-plate from rising with the ball and rod, would slide on the rod and remain at the lowest point to which it had been drawn. The instrument having been raised, and the depth registered, the indicator must be slid to the highest part of the rod, and the instrument will then again be ready for use. I have not shown the proper number of wire-rods for the outer frame for clearness' sake; a sufficient space should be left between them to admit of the fingers being inserted for raising the indicator to its proper position. As air is compressed, or occupies about half its bulk or space at a depth of 32 feet, one-fourth the original space at 64 feet, an eighth at 128 feet, and so on, in a cylinder of uniform diameter, the

lower portion of the cylinder would be of little service in deep-sea soundings save as a first receptacle for air, and therefore for deep soundings it might be found desirable to form the air-chamber of a conical shape, and so render the gradations on the scale more regular than in the straight tube.

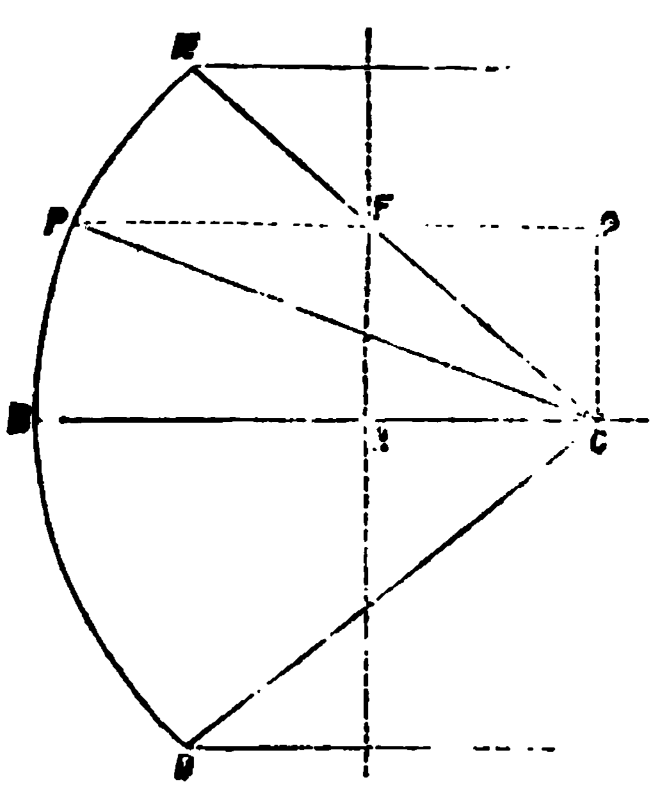
E. C.

Nov. 8, 1853.

ANSWER TO GEOMETRICAL INQUIRY.

To the Editor of the Mechanics' Magazine.

Sir,—In reply to the inquiry of your correspondent, "A Constant Reader," published on page 329 of your current volume, I will, with your permission, say that the barrel he describes could not be formed out of the material he mentions. It is evident that the surface of the barrel would be generated by the revolution of a segment of a circle about a line parallel to its chord, and therefore would not be developable. Supposing, however, that an approximate solution will be of service to the inquirer, I will treat the question accordingly, and point out the equation which would determine the form of the edges of the staves.



Let DBE be a section of the cask through its axis, AF; C the centre of the section; AB the radius of the greatest transverse section of the barrel; CB=R, and AB=r.

Take P any point in the section DBE, and draw PQ parallel to AF. Then FP will be the radius of the barrel at P; and the circumference at that point will therefore be $2\cdot \text{PF}\cdot\pi$, and the breadth of a stave, supposing there to be n of them, is therefore

$$\frac{2\cdot\pi\cdot \text{PF}}{n},$$

and therefore the half breadth is

$$\frac{\pi}{n}\,.\,\text{PF},$$

which, if $\angle \text{PCB}=\theta$,

$$=\frac{\pi}{n}\,(\text{R}\cos\theta-\text{R}+r)$$

$$=\frac{\pi}{n}\,(r-\text{R versin}\,\theta).$$

Again, PB=Rθ.

∴ if the middle line of the stave be taken for the axis of x, and the middle point of that line for the origin, we have

$$x=\text{R}\theta$$

$$y=\frac{\pi}{n}\,(r-\text{R versin}\,\theta;$$

and the equation to the edge of the stave is

$$y=\frac{\pi}{n}\,\left(r-\text{R versin}\,\frac{x}{\text{R}}\right).$$

I am, Sir, yours, &c.,

"A."

STEAM RAILWAY BREAKS.

To the Editor of the Mechanics' Magazine.

Sir,—In the *Courrier de l'Europe*, of the 29th of October, there is a notice of a railway break, which, if practicable, seems to possess the merit of quickness and certainty of action in a greater degree than any I have noticed in your Magazine; I have therefore sent you the English of it for the benefit of your readers, if you should think it worth the trouble of insertion.—N. B.

"Mr. Alexandre Raux, of the Northern Railway, is the inventor of a steam-break, by which all the wheels of a train (locomotive, tender, and carriages,) may be stopped simultaneously, and in a few seconds. The importance of such an invention is so apparent, that it requires no comment from us. The construction of the break is as follows: —Suppose a small cylinder placed between the axles of each carriage; in which cylinder are two pistons, capable of pressing the break blocks (*sabots*) against the wheels. A tube passes under the whole train, closed behind, and opening into the boiler in front, for the purpose of communicating steam to all the cylinders. On admitting the steam between the pistons they move out, and press the blocks against the wheels, which are thus immediately stopped, and the train only slides upon the rails. When the action of the steam has ceased the blocks are drawn back to the former position by hooks, to which springs are attached. That a break

may be as efficacious as possible, it seems necessary that there should be a large amount of force, and a quick and simultaneous application of that force to all the wheels of the train; these conditions seem to coexist in the invention of M. Raux, for the force is that of the steam itself; the application of the force to all the wheels is simultaneous, for the engine-driver has only to put the apparatus into action, which may be done *quickly* enough; for he has but to open a valve (*robinet*), and the work will be done in the time in which a jet of steam can travel from the boiler to the last carriage, that is, in a few seconds."

SPECIFICATIONS OF PATENTS RECENTLY FILED.

Jacques Stanislas Vigoureux, of Reims, France. *Certain improvements in the combing of wool and other fibrous materials.* Patent dated April 29, 1853. (No. 1043.)

The main feature of this invention consists in the employment of two wheels or discs situated side by side, and furnished with a ring of heckle-points or card-teeth set perpendicularly to their faces, one wheel having the teeth inside and the other outside, so that the teeth of the two wheels when working may be brought close together. The shafts on which these discs are mounted have a lateral motion imparted to them, the faces of the wheels first approaching each other, or one of the wheels approaching the other, so as to cause the teeth completely to penetrate the fibrous substances to be operated on, and then separating, first in the direction necessary for drawing out the fibres, and then in another direction, either for the purpose of approaching the substance as it is fed in, or of resuming their first position in contact with each other.

Claims.—1. The double movement of the rotary combs, by which they are carried in the two directions necessary for performing their functions, whether by the means described or by other means.

2. Varying the pitch of the feed-roller, as regards the plate, in proportion to the length of the staple, in order to regulate the feed.

3. Constructing a machine with a successive series of small combs, which are rotary combs, the movement of which shall always present parallel to each other the circles formed by the comb-teeth, whether they recede from, or approach in contact with each other.

Colin Mather, of Salford Iron-works, Salford. *Improvements in apparatus used in bleaching.* Patent dated April 29, 1853. (No. 1045.)

The object of this invention is to cause the bleaching liquid to flow up the puffer-pipe as soon as the steam is turned on, and this is accomplished by having a jet or jets of steam passing up the puffer-pipe, so that the liquor, flowing after the steam, rises to the desired level, and falls over into the vessel containing the cloth.

Claim.—The arrangement and application of apparatus, as described, to cause the flow of bleaching liquor in a suitable vessel.

Oliver P. Drake, of Massachusetts, United States. *A new or improved apparatus for vaporising benzole, or other suitable volatile hydro-carbon, and mixing it with atmospheric air, so that the mixture may be burnt for the purposes of illumination or otherwise.* Patent dated April 29, 1853. (No. 1047.)

This invention consists in,—

1. The combination of a heater and gas-burner with a water-vessel and vaporising-chamber, so that by means of the heater and gas-burner, and pipes connecting them with the water-vessel and the vaporising chamber, the whole or part of the mixture of air and benzole, or hydro-carbon vapour, produced by the apparatus, may not only be used in any convenient place for the purpose of illumination, but also for heating the water of the water-vessel.

2. In the combination of a closed vaporising-chamber, a rotary vaporiser or disseminator, and a rotary meter-wheel, with its closed case, or an air-forcing apparatus, made to force a stream of air into and through the vaporiser, and against portions of it saturated with the volatile hydrocarbon or benzole.

3. In combining with the rotating meter-wheel and its case and the hot water-vessel, a coiled induction air-pipe, made to pass through the water in the said vessel and receive heat from it so as to warm the air as it passes through the pipe.

4. In combining with the induction air-pipe a small chamber and a regulator slide and orifice, for the purpose of regulating the temperature of the air passing to the meter-wheel.

5. A mode of making the disseminator of two perforated heads or discs, a hollow perforated shaft, and absorbent strands.

6. A mode of using the meter-wheel, its case and liquid, as an air-blast apparatus.

John Kealy, of Oxford-street, agricultural implement maker. *Improvements in machinery for mowing.* Patent dated April 29, 1853. (No. 1048.)

The principal feature of the machine described under this patent consists in the

employment of a reciprocating knife composed of two curved blades, attached to a straight stem, cutting in both directions against a segment-plate at front of the machine, which holds up the grass during the cut, the action of the blades being similar to that of shears.

Instead of the double reciprocating knife the machine may be furnished with two sets of curved blades rotating in opposite directions, so as to gather in the grass, and shear it off against their respective segment-plates.

James Bristow, of Bouverie-street, London, miller, and Henry Attwood, of Holland-street, Blackfriars, Surrey, engineer. *Improvements in the means of consuming smoke.* Patent dated April 29, 1853. (No. 1049.)

This invention relates to a mode of constructing and arranging the flues of steam-boilers and other furnaces when two or more are set side by side or brought into connection with each other, so that the smoke or gases of combustion given off from one furnace may be conducted over the bright fire of another furnace, and be thereby consumed. This object is effected by bringing the several adjacent furnaces into communication with a common flue provided with dampers, which will permit of a temporary connection being set up between any two furnaces in the range. Thus, when fresh fuel is thrown into one of the furnace fires, by diverting the course of the gases generated in that furnace, and causing them to enter the common flue (which diversion may be effected by closing the damper in the exit flue of the smoking furnace), the smoke and gases may be conducted into a furnace having a bright fire and be there consumed. When smoke ceases to be given off from the recently-charged fireplace, the gases of combustion are then turned into their proper channel, and allowed to escape into the chimney.

Claim.—The means hereinbefore described by which any two of a series of furnaces may be readily brought into connection with each other, for the purpose of effecting the combustion of the smoke given off from the successive charges of coal supplied to such furnaces.

Barnabas Barrett, of Ipswich, sculptor. *Improvements in the treatment of natural and artificial stone, and of articles composed of porous cements or plaster, for the purpose of hardening and colouring the same.* Patent dated April 30, 1853. (No. 1051.)

The inventor introduces the liquid indurating substance into an exhausted chamber containing the stone to be indurated, the liquid substance being previously heated to a temperature of about 50° or 60° Fahrenheit. When the stone requires to be coloured the colour is laid on with a brush, and allowed to dry, before the indurating process is commenced. The mixture employed by the inventor for indurating stone is composed of 56 parts, by weight, of sulphur, dissolved by the aid of steam or dry heat, and 44 parts of dilute vinegar or acetic acid, containing 17 parts of acid to 8 of water.

In preparing indurating mixtures to be applied to the exteriors and interiors of buildings, whether the surface be of brick, stone, cement, or plaster, he employs—

Mixture 1.—14 parts, by weight, of shellac, 14 parts of seed lac, 1 part of coarse turpentine, and 40 parts of pyroligneous spirit.

Mixture 2.—Gutta percha dissolved in coal tar, naphtha, or other suitable solvent, in the proportion of 3 parts, by weight, of gutta percha, and 8 parts of the solvent.

Mixture 3.—One bushel of limestone or chalk, 12 gallons of water, 12 lbs. of alum, half a gallon of beer-grounds, and half a gallon of gall, well mixed together.

These solutions, when heated, are to be laid on with a brush until the surface will absorb no more.

Claim.—The above means, or any mere modifications thereof, for hardening and colouring natural and artificial stone, and articles composed of porous cements or plaster.

Weston Grimshaw, of Mossley, Antrim, Ireland, flax spinner. *Certain improvements in slubbing and roving frames for preparing for spinning cotton, flax, and other fibrous substances.* Patent dated April 30, 1853. (No. 1053.)

The improvements claimed as constituting this invention consist in the construction of slubbing and roving frames, with three more parallel rows of spindles instead of with two rows or one row, as heretofore practised.

John Balmforth, William Balmforth, and Thomas Balmforth, of Clayton Lancaster, iron-masters. *Certain improvements in steam-hammers.* Patent dated May 2, 1853. (No. 1054.)

These improvements relate to steam tilt-hammers, and consist mainly in the employment of an oscillating steam cylinder, having its piston-rod connected direct to the helve of the hammer near to the hammer-head and beneath the helve in such position as to allow clear access to the hammer from all sides. The axes on which the hammer tilts are furnished with screw bearings, to enable one side to be raised more than the other, and thus allow of irregularly-formed masses being forged

A modification of the machine enables it to be used for riveting.

Claim.—The construction and arrangement of the steam-hammer with the oscillating cylinder, regulating screws, &c., for the purposes set forth.

HENRY CONSTANTINE JENNINGS, of Great Tower-street, London. *Improvements in the manufacture of soap.* Patent dated May 2, 1853. (No. 1057.)

This invention consists in converting stearine into soap by means of a carbonated alkali with heat, instead of employing a caustic ley or alkali, with long boiling. The patentee uses in combination with stearine, whether obtained from palm oil, tallow, or any other vegetable or animal substance that yields stearine, such portions of common fat, or resin, or other substance, as will tend to cheapen the manufacture, and produce the commoner kinds of soaps. The result of this process is a harder and more neutral soap than that ordinarily produced.

Claim.—"The use of carbonated alkalis, whether vegetable or animal" (What does this mean?) "in combination with stearine or margarine, palmatine, or any other similar substance whatever; and aqua ammonia, for the production of soap and effecting saponification at a low temperature by these combinations."

JOHN FILMORE KINGSTON, of Carrol County, Maryland, United States of America, engineer. *Improvements in reaping and mowing-machinery.* Patent dated May 2, 1853. (No. 1058.)

This invention consists of employing a rotatory cutter, composed of two arcs of a circle, which cutter is fixed on a vertical shaft turning in a bearing at its upper end, and supported and rotating at its lower end in a step on a platform or frame near the ground. The machine moves on three wheels, one on either side, and the other at front under the platform. Motion is given to the cutter-axis by means of an endless band acting on drums respectively fixed on that axis and on a vertical spindle driven from a bevel-wheel on the axis of the two side wheels. The cut crop is moved off to one side of the machine by a vertical roller, which is set in revolution by a band or strap.

Claim.—The combination of parts herein described.

JAMES REEVES, of Bridgewater-gardens, Barbican, London, gold and silver-turner. *Improved machinery for fixing, stamping, crushing, or otherwise treating metals, ores, and other similar materials.* Patent dated May 2, 1853. (No. 1060.)

In this machinery the hammers are attached to long stems sliding in guides, and having formed on them rach-teeth, which are geared into the teeth on a segment-wheel, the revolution of which causes the hammers to be alternately raised and allowed to fall on the materials to be operated on. Motion is given to the shaft carrying the segment-wheels by wheels gearing from another shaft which is turned by a winch-handle.

Claim.—The machinery for forging, stamping, crushing, and otherwise similarly treating metals, ores, and other similar materials the nature and character whereof is hereinbefore set forth.

GEORGE MURTON, of Eagley Mills, near Bolton, Lancaster, manufacturer, and WILLIAM HATTON LANGSHAWE, of the same place, manager. *Certain improvements in stretching, dressing, and finishing cotton and linen yarns or threads, and in the machinery or apparatus connected therewith.* Patent dated May 2, 1853. (No. 1061.)

This invention relates to a peculiar method of stretching, dressing, and finishing cotton and linen yarns or threads whilst they are being wound from one set of bobbins on to another. The bobbins of yarn or thread being arranged in a creel or frame, the threads are passed through a coarse reed and over and under guide-rollers placed in a trough containing a sizing liquor composed of size, wax, &c., and then between a pair of solid iron squeezing-rollers, covered with felt, or other suitable material, in order to remove all superfluous size. The threads now proceed through a series of open reeds and stationary brushes, placed alternately, and extending over a space of ten or twelve feet, to the drawing or delivering-rollers. The brushes which are nearest to the squeezing-rollers are enclosed by a cover, and contiguous to them are placed steam-pipes or chests, and beneath them rotary fans or air-draught flues. The drawing-rollers are formed of solid iron, and covered with felt, or other suitable material, and are caused to revolve faster than the squeezing-rollers by means of gearing. The threads pass from the drawing-rollers to the second set of bobbins, which are mounted upon vertical revolving spindles at the delivering end of the apparatus, the bobbins being weighted and resting upon cloth or felt washers. As the threads pass from one set of bobbins to the other, they are first sized and waxed, the squeezing-rollers returning the superfluous size back to the trough; they then pass through the stationary brushes, which lay the fibres even and smooth, at the same time that a current of heated air is caused to pass through and dry the threads; and as the drawing or delivering-rollers revolve quicker than the

squeezing or entering-rollers, the threads are thus kept in a proper state of tension, and are simultaneously stretched or held distended during the operation of dressing and finishing.

AUGUSTE EDOUARD LORADOUX BELLFORD, of Castle-street, Holborn, Middlesex. *Improvements in the extraction and manufacture of sugar and of saccharine matters.* (A communication.) Patent dated May 2, 1853. (No. 1062.)

The inventor describes a purifying and clarifying process, in which the sugar, charged with molasses, is enclosed in a vessel of the form of a frustum of a cone, having its broader end uppermost, and furnished at its lower part with a metallic sheet fit for retaining the crystals of sugar. To the upper part of this vessel is attached a forcing-pump, or a tube of several yards in height, furnished with a cock for the purpose of bringing upon the mass of sugar a column of clarifying matter, which presses out the molasses without mixing with it, and introduces itself into its place. If it is then desired to clear away the clarifying matter with which the sugar is thus impregnated, air is forced down from above, and thereby forces the clarifying matter out, leaving the sugar white and drained. He also describes additional apparatus, and claims the process described for the extraction of saccharine matters, and the application of the apparatus described, or of any other similar apparatus, to the clarifying of sugar and the extraction of saccarine matters contained in beet-root, either fresh or dried; and also the application of the same apparatus to the extraction of malt for the manufacture of beer.

FRANÇOIS MONFRANT, of Paris, France, now residing in the Haymarket, Westminster, coal merchant. *Improvements in lubricating materials.* (A communication.) Patent dated May 2, 1853. (No. 1064.)

This invention consists in the manufacture of lubricating materials by the employment of all fatty oils (with the exception of coleseed oil), disacidified by means of milk, and caused to blend and intermix with fat or a fatty body by means of resin or a resinous composition.

AUGUSTE EDOUARD LORADOUX BELLFORD, of Castle-street, Holborn, London. *Improvements in sawing-machines for slitting or re-sawing plank and other timber by means of circular saws.* (A communication.) Patent dated May 2, 1853. (No. 1065.)

Claim.—The employment of a circular saw with both faces convex, whether the said convexity is produced in a solid plate or made by securing other plates to the sides of a saw constructed in the usual way, when this is combined with a guide or gauge for spreading apart the plank or other timber, to prevent the binding of the saw, as described.

THOMAS CLARIDGE, of Bilston, Stafford, engineer. *New or improved machinery for cutting or shearing metals.* Patent dated May 3, 1853. (No. 1071.)

Claims.—1. Placing the centre on which the upper blade of a shearing-machine turns above the plane on which the plate to be cut moves, so as to permit the plate to be cut to pass freely through the machine, as described.

2. Taking the pressure from the centre-pin, by means of a friction-plate or arc on the shear-head, and a method of adjusting the said pin, as described.

3. Guiding and adjusting the shear-head, by means of a guide-plate, as described.

4. A method of adjusting and securing the lower or fixed cutting-edge of shearing machinery, as described.

GEORGE FREDERICK GOBLE, of Fish-street-hill, London, civil engineer. *Improvements in locks.* Patent dated May 3, 1853. (No. 1074.)

Claim.—A peculiar arrangement of double-acting levers, slides, or springs, either combined or separately, applied to locks and keys, as described.

RICHARD QUIN, of Rodney-street, Pentonville, Middlesex. *Improvements in the manufacture of cases for jewellery, for optical and other instruments, miniatures, and other articles.* Patent dated May 3, 1853. (No. 1075.)

This invention consists in forming such cases of layers of paper, cotton, or other such fabric, connected together by an adhesive substance, and moulded as required.

LOUIS CORNIDES, of Trafalgar-square, Charing-cross. *Improvements in treating certain ores and minerals, for the purpose of obtaining products therefrom.* Patent dated May 3, 1853. (No. 1078.)

The inventor claims the performing of the processes of amalgamation and separation in a vacuum; and also certain apparatus to be employed in the process.

FREDERICK ARNOLD, of Park-road, Barnsbury. *Improvements in binding or covering books.* Patent dated May 3, 1853. (No. 1080.)

These improvements consist in fastening a hinge or hinges to each of the covers of the book; or to the back of it, between the cover, and in attaching the hinge also to the body of the book, by means of rivets or otherwise. The hinge-bolt may be fitted either so as to be moveable or permanently fixed. Books constructed in this manner are found to open and shut more readily, and present a more level surface to the reader or writer than those now used.

WILLIAM EDWARD NEWTON, of Chancery-lane, Middlesex, civil engineer. *Improvements in hot-air furnaces for heating buildings, some of which improvements are applicable to other furnaces.* (A communication.) Patent dated May 3, 1853. (No. 1081.)

Claims.—1. The method of supplying heated air for the combustion of the inflammable gases evolved from the fuel through apertures in a plate or other equivalent or suitable contrivance placed within the fire-pot or chamber, and made to discharge jets of air into the space through which the products of combustion pass.

2. Making such air-supplying apparatus moveable and adjustable within the fire-pot or chamber, for the purpose of adapting it to the varying height and condition of the charge of the fuel, so as to effect the economic combustion thereof, as specified.

3. Making such air-supplying apparatus in two parts.

4. Forming the flues for the heating of the air, by means of flanches projecting from, and forming part of the outer surface of the fire-pot, and enclosed by a surrounding wall.

5. Causing the air to pass through small apertures in a flanch projecting from the outer surface of the fire-pot, as a means of imparting heat by conduction to the air when subdivided into small streams.

6. Discharging the heated air into the hot-air chamber or chambers, through minute apertures. as a means of increasing the velocity of the discharged air, and insuring a more rapid circulation of air through the flues, and to the apartments to be heated.

7. Dividing the hot-air chamber into two or more compartments, by means of partitions provided with apertures governed by dampers or valves, for the purpose of regulating the supply of air to separate parts of a building.

WILLIAM EDWARD NEWTON, of Chancery-lane, Middlesex, civil engineer. *Improved machinery or apparatus for dressing mill-stones.* (A communication.) Patent dated May 3, 1853. (No. 1083.)

Claims.—1. Hanging the arm which carries the pick upon a shaft which receives a vibratory motion through a cam driven by the mill or other spindle, the said arms being moved lengthwise along the shaft.

2. The combination of a pedestal, a head-piece, a cam, constructed and worked so that the cam revolves upon a solid bed, and the tremor produced by its rapid motion is not transmitted to the head-piece and bed-piece.

3. The combination of a slotted arm with a bed-piece and a head-piece.

4. The employment of washers for the purpose of raising or lowering the pick-stock in proportion to the length of the pick.

5. A method of instantaneously regulating the force of the blow by the motion of a lever.

6. Making the slotted arm which is fitted upon the rocking-shaft in two pieces, for the purpose of increasing the effective range of the pick.

GEORGE BELL, of Inchmichael, Perth, Scotland, farmer. *A new machine for several agricultural purposes.* Patent dated May 4, 1853. (No. 1084.)

This invention consists in the combination of certain agricultural implements, already well known, into one machine, mounted upon a frame and rollers or wheels; the object of the combination being to perform the several operations of manuring, depositing grain and other seeds, harrowing-in, and rolling, with the one machine, so as to avoid the necessity of employing different machines at different times.

EDWARD WALMSLEY, of Heaton Norris, Lancaster, spinner. *Improved modes of preventing accidents arising from an insufficient supply of water in steam boilers.* Patent dated May 4, 1853. (No. 1085.)

Claim.—The particular valve described, or any other suitable valve which is opened and closed by the variation in the level of the water in the boiler, for the purpose of giving warning or extinguishing the fire under the boiler.

JEAN BRANDO GIANNETTI, of Paris, France. *Applying the ascensional force of balloons to various useful purposes.* Patent dated May 4, 1853. (No. 1088.)

This invention consists in employing balloons under water for various purposes, such as raising sunken bodies, buoying-up ships and vessels, and bringing whales to the surface, &c.

The inventor claims;

1. The employment of balloons immersed in a liquid.

2. A described mode of inflation.

3. Several applications of the former parts of the invention, among which are those mentioned above, and a method of producing motive power by attaching heavy weights to the lower parts of two balloons, and then alternately inflating the latter with gas when sunk, and emptying them at the surface.

THOMAS MASTERS, of Oxford-street, Middlesex, confectioner. *Improvements in apparatus for freezing, cooling, and churning.* Patent dated May 4, 1853. (No. 1089.)

The improvements constituting this invention are fully described in the first article of the present Number.

JOHN SCOTT RUSSELL, of Great George-street, Westminster. *Improvements in marine steam-engines.* Patent dated May 4, 1853. (No. 1094.)

Claims.—1. Connecting the piston-rods of three steam-cylinders to one crank, as described.

2. Connecting oil-cups or vessels of steam-engines by sliding-tubes, in order to supply lubricating matter, as described.

3. A combination of mechanism, described, for connecting and disconnecting the propeller, by the rotation of the shaft.

CHARLES GOODYEAR, of Avenue-road, St. John's-wood, Middlesex. *Improvements in combining India-rubber with certain metals.* Patent dated May 4, 1853. (No. 1095.)

This invention has for its object the manufacture of articles of a hard compound made of India-rubber and sulphur (with or without other matters), subjected to heat; and the invention consists in combining with such hard compound, in the manufacture of articles therefrom, thin surfaces of gold, silver, or other metal on the exterior or interior of such articles.

Claim.—The mode of combining India-rubber with certain metals in the manufacture of articles by moulding, the compound substance described, and the method of producing the hardening change in the compound substance by the application of heat thereto when it is in contact with the metal.

THOMAS TAYLOR, of the Patent Saw-mills, Manchester, Lancaster. *Improvements in apparatus for measuring and for governing the flow of water and other liquids.* Patent dated May 4, 1853. (No. 1096.)

Claims.—1. The adaptation to meters of apparatus capable of contracting and enlarging the induction orifice or orifices by the action of the fluid to be measured.

2. The application to apparatus for governing the passage of fluids of a valve moulded from gutta percha in a plastic state on to the seat of the valve.

3. A method described of raising valves to admit the passage of fluids.

WILLIAM EDWARD NEWTON, of Chancery-lane, Middlesex, civil engineer. *Improvements in apparatus for rolling iron.* (A communication.) Patent dated May 4, 1853. (No. 1097.)

Claims.—1. The employment of rolls, for rolling large bars of iron, arranged or mounted in a vertical or nearly vertical position when three rolls are combined together, one on each side of the centre roll, thereby constituting what is equivalent to two pairs of rolls, each pair rolling in opposite directions, so as to reverse the rolling on the bar, while, at the same time, the rolls have a continuous motion.

2. The employment of one or more supplementary or end rolls in combination with the main rolls, such end rolls having axes at right angles, or nearly so, to the axes of the main rolls, and acting in whole or in part against the ends and collars of the main drawing-rolls.

JOHN RAWE, jun., of Lemaile, near Wadebridge, Cornwall. *Propelling vessels and other vehicles on the water.* Patent dated May 5, 1853. (No. 1103.)

This invention consists in a method of propelling a vessel by means of buoyant drums placed along the middle of the vessel, and of such capacity that the vessel itself shall be but little immersed in the water.

MATTHIAS EDWARD BOWRA, of Crayford, Kent, India-rubber manufacturer. *Improvements in saddlery and harness.* Patent dated May 5, 1853. (No. 1106.)

This invention consists in forming the parts of saddlery and harness from strips of canvass cut to the size required, and after being coated with a solution of gutta percha or India-rubber, placed together in layers, according to the thickness required, and finally covered with a gum, which gives to them a solid face, possessing the appearance of enamelled leather. The inventor also describes a modification of the above, and claims the materials mentioned when used in combination in any or either of the modes described for the purpose of making saddlery and harness.

JOHN WHITELEY, of Stapleford, Nottingham, lace manufacturer, of the firm of Messrs. Whiteley, Ward, and Co. *Improvements in warp machinery for the manufacture of textile fabrics.* Patent dated May 5, 1853. (No. 1107.)

Claims.—1. The use and application of certain droppers for the purpose of opening the fabric into patterns.

2. The use and application of an additional needle-bar for the purpose of producing fabric with an irregular or scolloped-shaped edge, as described.

JOHN HETHERINGTON, of Manchester, Lancaster, machine maker. *Improvements in preparing cotton, wool, flax, silk, and other fibrous substances for spinning.* Patent dated May 5, 1853. (No. 1108.)

Claim.—The application of an artificial current of air for the purpose of drawing fibrous materials on to pointed instruments, which operate upon the fibres, and also for transferring or expelling the same therefrom.

THOMAS SYMES PRIDEAUX, of St. John's-wood, Middlesex. *Improvements in propelling vessels.* Patent dated May 5, 1853. (No. 1109.)

The object of this invention is to lessen

the quantity of power now expended on friction and lateral resistance. The invention makes the propeller-blades partly of a flexible material capable of bending one way only, and he receives the thrust of the propeller-shaft on a fluid, or soft substance, inserted in an air-tight cylinder, into which the end of the propeller-shaft fits. Instead of using gearing or trunk-engines, he proposes to work the propeller-shaft direct from the piston, by means of two connecting rods jointed to a ring, attached by appropriate framing to the piston-head, which rods will traverse the outside of the cylinder, steadied by appropriate guides or grooves. The inventor claims the above arrangements.

THOMAS FEARNLEY, of the Albion Works, Bradford, York, engineer. *Improvements in steam boilers.* Patent dated May 5, 1853. (No. 1110.)

Claims.—1. The general arrangement and construction of steam generators, as described.

2. The mode of constructing steam generators, wherein the combustion-chamber is placed immediately over the furnace or furnaces, as described.

3. The use of the passages or flues, as described.

PROVISIONAL PROTECTIONS.

Dated August 9, 1853.

1851. Thomas Young Hall, of Newcastle-upon-Tyne, coal-owner. Improvements in safety-lamps, part or parts of such improvements being applicable to the consumption or prevention of smoke, and for the purposes of ventilation generally.

Dated August 10, 1853.

1861. Alexander Prince, of Trafalgar-square, Charing-cross, Middlesex. A press applicable to the several purposes of lithography, autography, typography, chromo-lithography, or printing in colours, cooper-plate printing, cylinder printing, embossing, and copying letters. A communication.

Dated August 12, 1853.

1888. William Littell Tizard, of Aldgate, London, brewers' engineer. A new combination, or new combinations, of materials suitable for buildings and other structures, and parts thereof, and machinery for producing the same.

Dated August 17, 1853.

1923. Felix Alexandre Victor Delarbre, of Broad-street-buildings, London, gentleman. Certain improvements in treating fibrous substances.

Dated August 27, 1853.

1993. Samuel Taylor, of King-street, Manchester, barrister-at-law. Improvements in apparatus for generating and applying carbonic-acid gas.

Dated September 8, 1853.

2065. Robert Harrington, of Witham, Essex, watch-maker. Improvements in umbrellas and parasols.

Dated September 9, 1853.

2072. Jonas Radford, of Cheltenham, Gloucester. Improvements in clocks or time-keepers.

Dated September 16, 1853.

2156. Francis Birkin Newton, of Manchester, Lancastèr, tailor. Improvements in the mode or method of cutting and making up garments so as partially to dispense with seams or sewing.

Dated October 4, 1853.

2262. William Peace, of Haigh, near Wigan, Lancaster, mining engineer. Hewing and excavating coal, cannel, and other minerals, strata, and substances, by certain machinery and appliances thereto.

Dated October 7, 1853.

2297. John Onions, of Park-terrace, and Samuel Bromhead, of Marlborough Estate, both of Peckham, Surrey, engineers. Certain improvements in steam-engine boilers.

Dated October 14, 1853.

2365. Samuel Bromhead, of Marlborough Estate, Peckham, Surrey. Improvements in emigrants' and other portable houses and erections, and hinges of metal suitable to all purposes requiring hinges

Dated October 17, 1853.

2397. John James Haite and William Leach, both of New Coventry-street, London, musical-instrument makers. Improvements in the pistons of certain valved wind instruments. A communication.

Dated October 20, 1853.

2421. William Russell, of Birmingham, Warwick, tube-drawer. An improvement or improvements in the manufacture of copper tubes.

2423. John France, of North Wharf-road, Paddington, Middlesex. An improved morticing-machine.

2425. Gustave Gourgas, of Paris, France. Improvements in buffer traction or suspension springs for railway carriages, trucks, tenders, or locomotives.

2427. William Melville, of Burntisland, Fife, North Britain, tailor. Improvements in apparatus for drawing ships out of water. A communication.

Dated October 21, 1853.

2429. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in apparatus for sustaining bodies in the water. A communication.

2430. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in the treatment or manufacture of gutta percha, and in the applications thereof. A communication from Jacques Lefevre, of Paris, France, chemist.

2431. Christopher Cross, of Farnworth, Lancaster, manufacturer, and James Crosby, of Manchester, in the said county, manufacturer. Improvements in machinery or apparatus for weaving.

2433. James Warburton, of Addingham, York, spinner. Improvements in preparing rape-seed oil. A communication.

2435. Jean François Felix Challeton, of Paris, France. Certain improvements in carbonizing and distilling peat, coal, wood, and other animal, vegetable, and mineral substances.

2436. Pierre Marie Fouque, civil engineer, Louis Réné Hébert and Vincent Etienne Doret le Marneur, of Paris, France. A fortune-rudder, in bronze.

2437. Samuel Lloyd the younger, of Wednesbury, Stafford, engineer. Improvements in the construction of turntables.

2438. James Greenbank and Samuel Pilkington, of Withnell, Lancaster, overlookers in the employ of Messrs. John Park and Sons, of Withnell afore-

said. Improvements in machinery for spinning cotton and other fibrous substances.

2439. Henry Cook, of Devonshire-terrace, Middlesex, artist, and Augustus Cook, of Upper Berkeley-street, in the same county, surgeon-dentist. Improvements in the means of communication between guards, engine-drivers, or passengers in or on railway trains.

Dated October 22, 1853.

2441. Harry Bentley, of Salford, Lancaster, roller and spindle-maker, and millwright. Improvements in steam boilers, and in the method of setting or fixing the same

2442. John Baily, of Mount-street, Grosvenor-square, London. The cure of the roup and other diseases in fowls and poultry.

2444. Thomas Connell, of Cork, solicitor. An improved safety apparatus and method or means of signalling to be used on railways in cases of danger or emergency.

2445. Thomas Walker, of Pimlico, Middlesex, engineer. An improved railway break.

2446. Hume Greenfield, of Old Cavendish-street, Middlesex, gentleman. Improvements in obtaining power by carbonic acid gas. A communication.

2447. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in mills for grinding. A communication from Messrs. Fromont and Son, of Chartres, France, machine-makers.

Dated October 24, 1853.

2448. Henry Kraut, of Zurich, in Switzerland, engineer. Improvements in apparatus for regulating the temperature of stoves and furnaces, and of water, air, or other fluids contained in vessels or chambers, the strength of spirituous liquors and of chemical mixtures, and the hygrometric state of the air in buildings, rooms, &c.

2449. Thomas Stainton, of South Shields, Durham, cast iron and brass founder. Improvements in steering-apparatus.

2450. James Denoon Young, of Westminster, Middlesex, engineer and manufacturer. Improvements in casting.

2451. Charles Brewster, of Dunmow, Essex. Improvements in printing-machinery. A communication.

2453. Alexander Hett, of Stoke Newington, Middlesex. Certain improved means or arrangements for the prevention of smoke and the economizing of fuel in furnaces.

Dated October 25, 1853.

2458. John Fordred, of Dover, Kent, gentleman, and Thomas Boyle, of Forest Gate, Essex, gentleman. Improvements in daylight reflectors, and in apparatus to be used in connection therewith.

2460. Alfred Curtis, of Sarratt Mills, Herts, paper-manufacturer, and Bryan Donkin the younger, of Bermondsey, Surrey, engineer. Improvements in machinery for cutting rags, rope, fibrous, and other substances.

2464. David Bogue, of Fleet-street, London, publisher. An improved mode of producing printing surfaces. A communication.

2466. Charels Goodyear, of Avenue-road, St. John's Wood, Middlesex. Improvements in the manufacture of boots and shoes.

Dated October 26, 1853.

2470. George Gower Woodward, of Lesswels, near Kidderminster, Worcester. Improvements in the manufacture of carpets.

2472. George Holworthy Palmer, of Sheffield, York, civil engineer. Improvements in the construction of air-furnaces for the fusion of steel and other metals, and for economizing fuel.

2474. William Penrose, of the Landore Silver Works, near Swansea, Glamorgan, assayer. Improvements in the reduction of silver ores by mixture with other materials.

2476. Patrick Benignus O'Neill, of Rue Miromenil, Paris. Improvements in screw-wrenches. A communication.

2478. Uriah Lane, of North-street, Brighton, Sussex. Improvements in measuring and indicating time.

2480. Thomas Dunn, of Windsor Bridge Iron-works, Pendleton, near Manchester, Lancaster, engineer, and William Gough, of Old Compton-street, Soho, London, Middlesex, engineer. Improvements in the manufacture of veneers, and in machinery and apparatus connected therewith.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," November 8th*, 1853.)

1410. William Muir. Improvements in turning-lathes, a part of which improvements is applicable to other useful purposes.

1428. William Smith. Improvements in the mode of manufacturing metallic handles for knives and forks, backs for razors, bows for scissors, and the relative parts of such like instruments.

1429. John Marsh, Theophilus Marsh, James Marsh, and Walter Marsh. An improved mode of fastening the handles of table-knives and forks.

1461. William Christopher and Gustavus Gidley. Improvements in abstracting sulphur and other matters from vulcanized Indian-rubber.

1462. John Blair. A new and improved mode of cutting lappet-cloths or other similar fabrics.

1467. Peter Armand Lecomte de Fontainemoreau. An improved process for preserving milk, and its application to several organic products and alimentary substances.

1502. Hiram Barker and Francis Holt. Improvements in machinery and apparatus for grinding and turning metals.

1511. Allan Macpherson. Improvements in disinfecting sewers or other drains, and in converting the contents thereof to useful purposes.

1522. Frederick Ayckbourn. Improvements in the manufacture of waterproof fabrics.

1552. Robert Harlow. Improvements in constructing and working valves for baths, wash-stands, and other purposes.

1801. John Griffiths. Certain improvements in steam engines.

1836. William Newton. Improvements in the process of coating cast iron with other metals and the alloys of other metals. A communication.

1851. Thomas Young Hall. Improvements in safety-lamps, part or parts of such improvements being applicable to the consumption or prevention of smoke, and for the purposes of ventilation generally.

1936. William Curtain. Improved machinery for printing textile fabrics, oil-cloths, leather, paper-hangings, and other similar fabrics or materials.

1993. Samuel Taylor. Improvements in apparatus for generating and applying carbonic acid gas.

2029. John Tayler, James Griffiths, and Thomas Lees. Certain improvements in steam boilers, and in apparatus applicable thereto and to be used therewith.

2076. Michael Leopold Parnell. Improvements in the construction of locks.

2142. Thomas Browning. Improvements in machinery or apparatus for washing, scouring, or cleansing woven fabrics, either with plain or pile surfaces.

2194. Thomas West Walker. Certain improve-

ments in the manufacture of crates made of wood for the use of potters.

2206. Charles Edward Austin. An improved reaping, gathering, and binding-machine.

2232. James Griffiths. Certain improvements in steam engines.

2234. Hiram Berdan. A machine for collecting, preserving, and thereby preventing the loss of, mercury, in the process of amalgamating metals, and for the most perfect and economical washing, separating, and amalgamating of auriferous and other ores.

2243. John Summerscale and Benjamin Bancroft. Improvements in shuttles employed in weaving textile fabrics.

2248. Samuel Murland. Certain improvements in machinery for preparing linen yarn.

2262. William Peace. Hewing and excavating coal, cannel, and other minerals, strata, and substances, by certain machinery and appliances thereto.

2285. Manuel Fernandez de Castro. Improved means of preventing accidents on railways.

2322. James Knowles. Improvements in machinery for regulating the velocity of steam engines and other motive power engines.

2341. Patrick Clark and Alexander Clark. Improvements in revolving shutters and other closures for portable and other buildings.

2346. George Bradley. Improvements in stoppers or covers for bottles, and in the tools or apparatus for manufacturing the same.

2348. Charles Scott Jackson. Improvements in preserving seeds, potatoes, and other roots.

2352. Henry Whitaker Butterworth. An improved supplemental reflux valve for steam engines. A communication.

2362. Thomas Grahame. Improvements in building ships and other vessels.

2393. Ellen Jones. Improvements in steam-engine governors.

2417. Thomas Thompson. Improvements in machinery for weaving carpets, coach-lace, and velvet.

2421. William Russell. An improvement or improvements in the manufacture of copper tubes.

2426. Julius Augustus Roth. Improvements in the bleaching and drying of fibres or fibrous materials, part of which improvements is applicable to the drying of woven and other textile manufactures

2438. James Greenbank and Samuel Pilkington. Improvements in machinery for spinning cotton and other fibrous substances.

2447. John Henry Johnson. Improvements in mills for grinding. A communication.

2450. James Denoon Young. Improvements in casting.

2474. William Penrose. Improvements in the reduction of silver ores by mixture with other materials.

2480. Thomas Dunn and William Gough. Improvements in the manufacture of veneers, and in machinery and apparatus connected therewith.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed November 3, 1853.

1666. Frederick Ransome.
1693. Charles Goodyear.
1694. Charles Goodyear.
1695. Charles Goodyear.
1818. James Billings.
1852. William Rowan.
1855. William Baines.
1872. Henry Moore Naylor.
1876. William Longmaid.
1943. George Hayes.
1958. Moses Poole.
1960. Charles Medwin.
1974. Edward Heard.
1988. Charles William Lancaster.
1994. Alfred Vincent Newton.
1998. John Foss.
2008. Charles Goodyear.
2009. Charles Goodyear.
2012. Alfred Vincent Newton.
2014. William Edward Newton.
2020. William Edward Newton.
2046. William Edward Newton.
2060. Weston Grimshaw and Ellis Rowland.
2082. Jonathan Amory.

Sealed November 5, 1853.

1106. Matthias Edward Boura.
1110. Thomas Fearnley.
1116. John Ryan Danks and Bernard Peard Walker.
1118. John Thomas Stroud.
1120. Peter Armand Lecomte de Fontainemoreau.
1123. Mariano Riera.
1124. Francesco Capeccioni.
1126. Christopher Richard Norris Palmer.
2151. Francis Higginson.

Sealed November 7, 1853.

1129. Hesketh Hughes and William Thomas Denham.

Sealed November 9, 1853.

1143. John Clapham, Thomas Clapham, and William Clapham.
1153. George Stevenson Buchanan.
1172. George Frederick Goble.
1234. Benjamin Newton.
1314. George Harriott.
1336. George Goodlet.
1348. William Knowles.
1377. Henry John Betjemann.
1427. William Henry Smith.
1481. John Piddington.
1673. Richard Archibald Brooman.
1681. George Gowland.
1742. Joseph Bennett Howell and William Jamieson.
1774. Griffith Jarrett.
1892. Daniel Illel Picciotto.
1925. Thomas Kirkwood.

2028. John Hinks, George Wells, and Frederick Dowler.
2059. William Joseph Smith.
2081. Cyprien Marie Tessie du Motay and Edmond Louis Duflos.
2083. James Childs.
2085. Ernest Alexandre Gouin.
2097. Robert Trouson.
2098. Thomas Metcalfe.
2100. John Ward and Edward Cawley.
2101. Joseph Marks and John Howarth.
2108. Joseph Maudslay.
2120. Jacob Behrens.
2122. Emerson Goddard.
2123. Moses Poole.
2134. Richard Dugdale Kay.
2135. Moses Poole.
2137. Jacob Behrens.
2148. Moses Poole.
2180. Moses Poole.
2185. Joseph Gibbs.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
Nov. 8	3528	C. Gammon	Bloomsbury	Collar-case.
9	3529	S. Twist and W. Morris.	Birmingham	Billiard-table.

WEEKLY LIST OF PROVISIONAL REGISTRATIONS.

Oct. 3	534	J. J. Bennett	Dover	Locomotive.
6	535	A. P. Poole	Cannonbury	Shirt.
12	536	J. E. Boyd	Thames-street	Scythe.
18	537	J. Franckling	Addle-street	Belt-clasp.
20	538	C. B. Young	Sutton	Slab.
Nov. 1	539	S. Messenger	Birmingham	Connecting-link.
3	540	J. Walker	London-bridge	Bullet.
,,	541	J. G. Reynolds	City-road	Emigrants' table.
4	542	C. Gammon	Bloomsbury	Collar-case.
5	543	J. Walker	London-bridge	Rifle-sight.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1680.] SATURDAY, NOVEMBER 19, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-stree

GRIST'S PATENT CASK-MAKING MACHINERY.

Fig. 6.

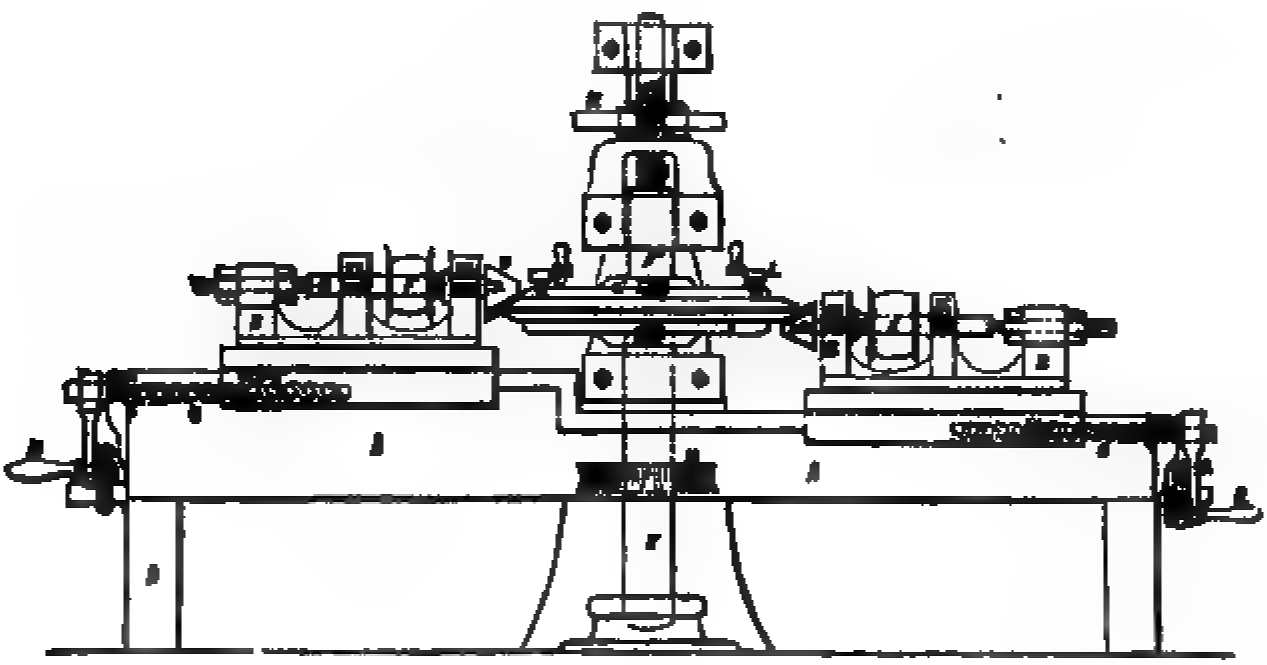
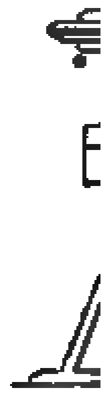


Fig. 1.

Fig. 7.



GRIST'S PATENT CASK-MAKING MACHINERY.

(Patent dated April 7, 1853.)

We lately published a full description of a set of cask-making machines, invented by Mr. Grist, of Islington.—(See *ante* No. 1575, p. 301.) The present invention consists of further improvements effected by that gentleman in machines of the same class, and in presenting them to the public we have again to express our high estimate of their merits.

It not unfrequently occurs that much ingenuity is often uselessly expended in the construction of machines for the same, or for a similar purpose, because of the inventor's disregard of the difficulties which, though unknown to theoretical men, are sure to occur in practice, and are well understood by practical persons. Mr. Grist, however, (who has been the manager of a cooperage for a considerable time) has constructed his machines with an especial view to the practical circumstances of the manufacture. It is on this account that we are able so strongly to recommend his inventions.

The present one consists; *Firstly*. Of a saw-frame for cutting and shaping what are technically termed by coopers, "doublet and tonguer staves." The nature of the improvements under this head of the invention, consists in fixing the wood in guides, which are so attached to the framework of the machine that as the wood passes to the saws they shall cause it to traverse in the required curvilinear path.

Secondly. These improvements have relation to that part of the manufacture of staves, which is called listing or chopping-off the waste wood, so as to form a partially made stave. Fig. 1 is a front view of a machine constructed according to this part of the invention. AA are two eccentrics mounted upon the shaft, B, supported in the standards C C. D D are the cutters mounted upon the spindle *a*, turning in slots in the eccentrics, A A, and driven by the strap-pulleys, E E. F is an upright frame occupying a central position between the eccentrics, A A, on the top surface of which the wood to be operated upon is held by the clamp G, having a screw, *b*, at each end. H is a crank keyed upon the shaft B, for imparting motion to the eccentrics and cutters. The eccentrics, A, are inclined towards each other as represented, so as to give to the wood its required shape as the eccentrics and cutters revolve.

Thirdly. These improvements have relation to the jointing of the stave. This is effected by means of revolving choppers set at the required angle, the blank out of which the stave is to be formed being passed between eccentric rollers in its passage between or against the choppers, whereby the stave has given to it the requisite bevel and bulge. Fig. 2 represents a plan, and fig. 3 a front elevation of a jointing-machine, constructed according to this part of the invention. AA is the framework, and B a top plate, on which are mounted the choppers, CC, keyed upon the spindles, DD, turning in the plummer-blocks, EE, and driven by the strap-pulleys, FF. G^1, G^2, G^3, are three eccentric rollers keyed upon the shafts, H^1, H^2, H^3, which are mounted in blocks in the framework, A′A′, and driven by the worm-wheels, I^1, I^2, I^3, and endless screws, K, K^1, K^2. The blocks carrying the shafts of the eccentric-rollers, G^1 and G^3, are free to slide to and fro in slots in the framework, carrying with them their endless screws and worm-wheels, and thereby causing the stave to traverse from one end of the choppers to the other, so as to impart to it its requisite bevel and bulge. L is a strap-pulley keyed upon the shaft, M, for giving motion to the endless screws and worm-wheels, and through them to the eccentric rollers.

Fourthly. The invention also consists of an improved trussing-machine for putting together the staves to form a cask. This is effected by means of a plate, which is divided into two parts, each part having a semicircular recess formed in it, so that when they are brought together by the action of right and left-handed screws, the recesses shall form a circle corresponding to the ends of the casks to be trussed. Fig. 4 is a side elevation, and fig. 5 an

end view of this improved trussing-machine. A A are upright standards or framework. B B is a plate divided across the centre into two parts, and having mounted on its under side the grooved wheels, C C, which travel upon angular bars or rails running the entire length of the machine. D D is a second plate, also divided across the centre, and having formed in it the semicircular recesses, E E. This plate is superposed above the plate, B. F F are two right and left-handed screws running along the length of the machine on each side. These screws are tapped through lugs bolted to the under side of the plate, D. G G are bevel-wheels keyed upon the ends of the screws, and geared into by the bevel-wheels, H H, mounted upon the cross shaft, I, and driven by the strap-pulleys, K, which impart motion to the right and left-handed screws, whereby the semicircular recesses in the plate, D, are brought together, bringing with them the ends of the staves. Previous to placing the cask, L, in the position represented in the engravings, the parts of the plate, B, are brought together so as to form a rest or support for it; but when, by the action of the screws, F F, the cask is trussed, the parts of the plate, B, are withdrawn towards each end,

Fig. 2.

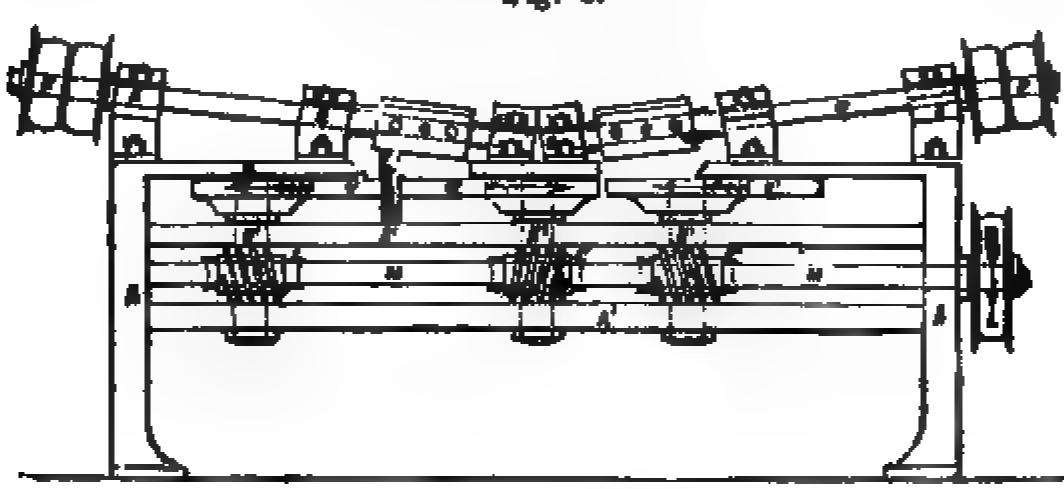
so as to admit of a hoop being placed over the end of the cask. The plate, B, is then again brought together, and by reversing the action of the screws the cask is released, and the machine is ready for trussing another cask.

Fifthly. The invention has relation to that part of the manufacture of a cask which is termed the "chiming or creusing," or cutting the groove for fixing the heads.

Sixthly. It has relation to a machine, in which the heads are planed preparatory to being fitted in the ends of the cask.

And, *Lastly*. The invention has relation to the bevelling of the edges of the heads of casks, by causing them to revolve between two sets of cutters, which are caused rapidly to rotate, the one set of cutters revolving upon the upper side of the head, and the other set on the under side, so that both edges are cut simultaneously. The requisite eccentricity is

Fig. 3.



given to the head by causing the spindles carrying the cutters to advance and retire during the revolution of the head between them. Fig. 6 is a front elevation, and fig. 7 an end view of a machine constructed according to this part of the invention. A A is the frame

and bed of the machine. B B are double bearings, sliding upon the bed of the machine when acted upon by the screws, C C. D D are the cutters, mounted upon the spindles, *a a*, and driven by the strap-pulleys, E E. F F[1] are two shafts, the centre lines of which correspond. The shaft, F, is passed through the frame, A, and has screwed upon its upper end the plate G. The shaft, F[1], is supported in the framework, H, and has screwed upon its lower end the plate, G[1], between which and the plate, G, the head to be bevelled is held firm, the upper plate being brought down by the action of the screw, I, and hand-wheel, K. L L are screws passed through the upper plate to adjust it to the unevenness of the head. M is a worm-wheel on the shaft, F, which is set in motion by the endless

Fig. 5.

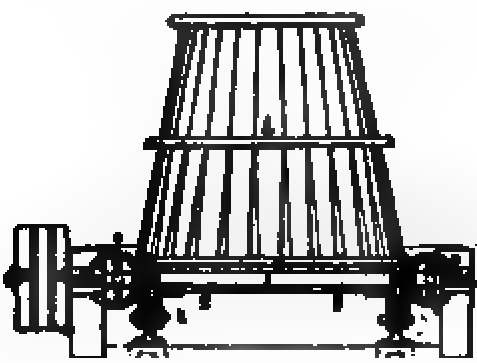
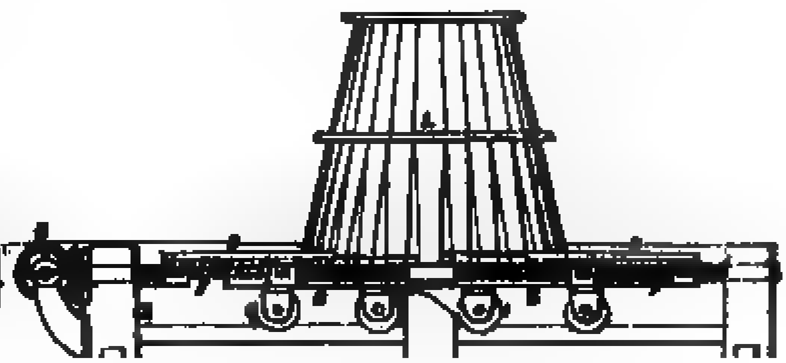


Fig. 4.



screw, N, for causing the head to rotate between the cutters. O O are eccentrics, which are keyed on a shaft, P, which runs along the whole length of the machine at the back, and are connected by rods and forks to a pin upon the crank-handles, R R, fixed upon the ends of the screws, C C, by which means, as the shaft, P, revolves, the cutters are caused to advance and retire, thereby giving to the head its necessary eccentricity as it revolves between the cutters.

EMIGRATION.*

(SECOND PAPER.)

At the conclusion of our former paper upon this subject, the following questions arose: "Can the transportation of our indigent populations to Australia be effected?" or, "Can it even be forwarded?" Upon a broad and abstract view of these, they certainly appear somewhat frivolous; and the first impulse of some readers will probably be to exclaim, "Can any one doubt a nation's ability to send a few paupers on a three months' voyage, when the merchants of that nation are princes, and her cities are almost gorged with gold!—when her harbours are full of idle fleets, and her glory is that she 'rules the waves?'" Upon a nearer view, however, the matter assumes quite another aspect. When we reflect upon the principles which guide, and the motives

* Since our previous paper was written, we have read the sentiments of the Home Secretary upon a subject we there had occasion to discuss, viz., the Causes and Prevention of Cholera; and the inappropriateness of public prayers against it, unaccompanied with strenuous efforts to promote sanitary improvements. The Moderator of the Edinburgh Presbytery of the Church of Scotland lately requested Lord Palmerston to inform him whether the Government contemplated the appointment of a national fast. The following are extracts from the reply sent from the Home-office: they will be read with uncommon interest by many:

"The Maker of the Universe has established certain laws of Nature for the planet in which we live; and the weal or woe of mankind depends upon the observance or the neglect of those laws. One of those laws connects health with the absence of those gaseous exhalations which proceed from overcrowded human beings, or from decomposed substances, whether animal or vegetable; and

which excite men to public undertakings, we very soon discover the stubborn antithesis that exists between what a nation can potentially and that which it can actually perform. Our present business is with the latter, and our remarks will therefore be of an essentially practical character.

We may first say, that it would be vain to rely at present upon moral or religious benevolence alone for the origination and development of any very general and effective system of emigration, by which our poor could be sent abroad. It is a strange fact (and one that can hardly be accounted for by recurring to the common vicissitudes of national life in civilized countries), that the religious people of Britain, *in general*, see more just now to interest them in heathens and savages than in their own unfortunate countrymen. They experience more delight in conducting schemes for proselytising the idolaters of India, and improving the barbarous islanders of Polynesia, than in ministering to the starving poor of the towns and cities of these lands. They are far more solicitous about Hindoos and Hottentots than about Englishmen, if the latter happen to be needy. That this unnatural state of things will hereafter be corrected, there can be no doubt. Already both superior intelligence and common sense are leagued against it. But at present there is no hope of any early change. A long time must pass away before the estranged affections of the churches will be brought back from the fascinating peoples of Madagascar, and Gilolo, and Tongataboo, to those who dwell in the hovels of Newcastle, and Liverpool, and London.

We must turn, then, from the benevolent, (until they grow less romantic in their attachments,) and consider whether there are any chances of prevailing upon commercial men to get our lower classes under sail. And, at first sight, these certainly seem but few. To a man of business a pauper is a most unattractive object. Sending him on an excursion halfway round the world appears by no means to be a promising undertaking. And yet, upon further consideration, a pauper is found to be not altogether without value to the commercial man. It must be remembered that at the least he may be made useful as a source of motive power, and also as a machine for employing it. Surely, even in these days of discovery and progress, such an admirable invention as the human body is not to be quite despised! The commonest man among us is so constructed, that if you keep him fed (which you may do cheaply), he can make himself useful in so many branches of industry, that it is worth any one's while to have an interest in him.

Moreover, this *human* class of machines is one very much needed just now among the hills and upon the plains of Australia. As domestics, as labourers of all kinds, as herdsmen, as shepherds, large exportations of them could very well, and very profitably, be employed. On the other hand, the man of business often finds it to his advantage to expend capital on objects from which he obtains no immediate return. Here, then, are elements which show that an arrangement satisfactory to both parties is not at all impossible. Let the capitalist, —whether broker, or merchant, or shipowner,—transport our poor to the colony, and receive subsequent payment for the voyage from the produce of their labour. The only matter that requires settling (one upon which we need not here decide) is, How shall the capitalist be made sure of his returns, without interfering with the rights and liberties of his debtors? For here a new view of a poor man enters. We have described him as a machine—but he is, of course, not a machine only. He is a moral and inviolable being; too sacred for thraldom—too august to be possessed by his fellow-man. The question just proposed is, therefore, a delicate one, and requires to be

these same laws render sickness the almost inevitable consequence of exposure to those noxious influences. But it has, at the same time, pleased Providence to put it within the power of man to make such arrangements as will prevent or disperse such exhalations so as to render them harmless, and it is the duty of man to attend to those laws of nature, and to exert the faculties which Providence has thus given to man for his own welfare.

"The recent visitation of cholera, which has for the moment been mercifully checked, is an awful warning given to the people of this realm that they have too much neglected their duty in this respect, and that those persons with whom it rested to purify towns and cities, and to prevent or to remove the causes of disease, have not been sufficiently active in regard to such matters. Lord Palmerston would therefore suggest that the best course which the people of this country can pursue to deserve that the further progress of the cholera should be stayed, will be to employ the interval that will elapse between the present time and the beginning of next spring in planning and executing measures by which those portions of their towns and cities which are inhabited by the poorest classes, and which, from the nature of things, must most need purification and improvement, may be freed from those causes and sources of contagion which, if allowed to remain, will infallibly breed pestilence, and be fruitful in death, in spite of all the prayers and fastings of an united but inactive nation. When man has done his utmost for his own safety, then is the time to invoke the blessing of heaven to give effect to his exertions."

We are not usually anxious that our opinions should be confirmed by authority, but we certainly were gratified to find so striking a confirmation of our sentiments proceeding from the noble Lord.

treated with much caution. It is evident that each party will require security; the capitalist for his cash—the man for his proper independence. It should be remembered that the debt incurred is in no way different from those of ordinary commercial transactions. The man *owes only money*—not himself, not even his service, except under well-guarded conditions. It will be seen that unless these things be well attended to, the obligation might be used as an instrument for reducing the poor to a species of slavery, to which our national feelings are excessively repugnant. The war between labour and capital is already sufficiently terrible in our own country: let us be careful that we do not encourage measures that will lead hereafter to a direr conflict in Australia.

We are thus explicit on this subject because of a dangerous Act of the legislature of New South Wales, which has already been for some time in existence. In that Act, it is provided that those emigrants who have their passage supplied at the expense of the Colony shall bind themselves to repay the debt thus incurred within a fortnight from the time of their arrival, or, in default of payment, bind themselves for two years with some employer, who shall pay half the amount down, and the other half within the following half year. Should the emigrants refuse to make such an arrangement, the Government agent is empowered to bind them to any service he may choose for them for two years, with no possibility of terminating the contract for the first twelve months, and then only by paying the proportion of their passage-money that is still due. The same legislature has also legalised contracts for five years' service, that may be entered into either in England or in the colony; apprentices may also be selected from children above thirteen years of age, and bound for four years. In another clause of the same Act it is stipulated that similar contracts entered into between free emigrants and shipowners, colonisation societies, and others, shall be made binding; and it is also provided, that "all individuals absconding from the employment thus entered upon, shall be liable to three months' imprisonment for the first offence, and six months on all subsequent occasions, with or without hard labour; while persons harbouring them are to be fined 5s. a day, until the debt of their passage-money shall be fully discharged." It is clear that the principles upon which this Act is framed are subversive of the natural right, and injurious to the natural liberties of the labourer. The capitalist is made secure, but it is by the sacrifice of the labourer's freedom. The enactment is a direct institution of temporary slavery; the only mitigating feature of it is, that the slavery is brought about by stratagem and not by force. But it does not follow, from the defectiveness of this Act, that no healthy and safe guarantees could be given for the passage-money of the poor. If the matter were but once taken up with only the ordinary energy of our countrymen, a satisfactory arrangement of this matter would soon be effected.

There is another, and, we conceive, a superior method of sending our eleemosynary poor to the Colonies; one which would be, upon the whole, inexpensive, fair, and safe. We allude to the mode of causing each parish to provide passages for such of its own poor, and to defray the expense by rates levied upon it. It is true that by this means burdens would be laid upon most of our parishes, perhaps for a year or two, but then the relief would soon be felt, and the loss more than compensated by the diminution of the subsequent poor-rates. We are aware that if such a measure as the one under consideration were about to be enforced, there would be plenty of opposition shown to it. But we are not therefore disposed to speak less decidedly in its favour. The fact is, our pauper system is a scandal to a nation possessing a colony like Australia. Why keep men idling in Unions at home, while the flocks of Darling Downs and New England are untended, and the soils of Macquarie and Bathurst are untilled? Would it not be both more prudent and more reasonable once to pay a pauper's fare to Sydney or Melbourne than to feed and clothe him for a course of years, and never free yourself of him till he is underground? It is high time for us to avail ourselves of so simple a method of relieving our land from the burden of its poor.

SOCIETY OF ARTS.—SUBJECTS FOR PREMIUMS.

In accordance with the usual practice of the Society, the Council have issued the following list of desiderata, as subjects for premiums, to be competed for during the 100th Session of the Society, which has just commenced. Many of these, it will be observed, are the same as were included in the List of last Session, whilst a large proportion being entirely new, open out a vast range for scientific research, mechanical ingenuity, and artistic taste, in the cultivation of which considerable impetus has doubtless been derived from the liberal and well-directed efforts of the Society. We sincerely hope the call now made will be

responded to by those who are in a position to devote their time and attention to the subjects brought under notice in their different departments of industry.

CLASSES I. TO IV.—RAW MATERIALS.

1. For the best essay on the existing methods and most recent contrivances for crushing and dressing hard rocks, containing metalliferous ores or native metals.

2. For an account of the details of copper ore, fuel, and the make of copper, in the different places where this metal is produced.

3. For same subject as No. 2, in the Premium-List of last Session, (published at page 423, vol. lvii.)

4. For same subject as No. 3 of last session.

5. For an account of the manufacture of tin, and of recent discoveries of new sources of supply.

6. For same as No. 5 of last session.

7. For same as No. 4 of last session.

8. For an account of the best proportions for the production of the compound metal bronze; and the preparation of bronze washes.

9. For same as No. 6 of last session.

10. For same as No. 7 of last session.

11. For an account of the manufacture of useful products from peat.

12. For same as No. 8 of last session.

13. For same as No. 9 of last session.

14. For same as No. 10 of last session.

15. For the best account of the methods of manufacturing ultramarine; and for the best specimen produced in Great Britain.

16. For same as No. 15 of last session.

17. For the preparation of any colour, applicable to the japanned surfaces of papier mâché, that shall be free from the brightness (or glare) of the varnished colours now used, but yet possess the same degree of hardness and durability.

18. For the preparation of certain light colours to be used in enamelling or japanning slate or iron, that will stand the action of heat from the fire without blistering or discoloration, and be sufficiently hard to resist scratches.

19. For a new and effective mode of protecting fine iron castings from corrosion when exposed to the atmosphere, without loss of sharpness, the clogging-up of small parts, and the other evil consequences of paint, and without destroying the natural colour of the metal, as in galvanizing.

20. For same as No. 16 of last session.

21. For same as No. 17 of last session.

22. For same as No. 18 of last session.

23. For same as No. 19 of last session.

24. For an essay on the modes of treating and preparing spices for the market.

25. For same as No. 20 of last session.

26. For the discovery of any new sources of supply of food, either by importation, or by the extraction of nutritious matter from substances hitherto deemed unavailable.

27. For an account of the gums of commerce, and particularly of such as are used in manufactures.

28. For same as No. 24 of last session.

29. For same as No. 25 of last session.

30. For an essay on the various fluids used for lighting, with their relative degrees of illuminating power, portability, and cost, and their comparative liability to accident.

31. For same as No. 27 of last session.

32. For improvements in the dye of woollen cloths, whereby the colour may be rendered permanent, and capable of resisting acids; to be cheaper than woad or indigo.

33. For an essay on the nature and properties of dyes, in their application to silk and other fabrics.

34. For same as No. 32 of last session.

35. For same as No. 33 of last session.

36. For same as No. 34 of last session.

37. For same as No. 35 of last session.

38. For the importation of at least two tons of any new vegetable fibre, applicable to all the purposes for which hemp is now used, and less costly, but equally strong and durable.

39. For the best samples of ornamental woods from New Zealand, or any other British Colony, suitable for the manufacture of furniture.

40. For the discovery of an economic substitute for the teazels used in raising the face or the nap of cloth.

41. For same as No. 38 of last session.

42. For the importation from any British possession in Africa, of not less than twenty pounds of silk, proper for manufactures.

43. For same as No. 40 of last session.

44. For same as No. 21 of last session.

45. For the best account of the mode in which size, from sea-weed, is prepared and used by the Chinese.

CLASSES V. TO X.—MACHINERY.

46. For an account of recent improvements in, or applications to, the furnaces of steam-engine boilers, for the consumption or prevention of smoke, without increasing the expense of working.

47. For an account of improvements in the furnaces of manufactories, especially in glass-works, iron-foundries, and the like, for the consumption or prevention of smoke.

48. For same as No. 43 of last session.

49. For same as No. 45 of last session.

50. For same as No. 44 of last session.

51. For a cheap and simple mechanical

register, not liable to get out of order, to be attached to cabs and other vehicles, so as to measure and indicate correctly the distances travelled.

52. For improvements in the construction and furnishing of public conveyances suitable to the streets of London.

53. For same as No. 46 of last session.

54. For same as No. 47 of last session.

55. For same as No. 50 of last session.

56. For an account of the machines at present in use, and for any improvements in the same, for sewing garments and other articles.

57. For the best and most economical mode of cutting out boots and shoes by machinery, so as to effect a saving of time and material.

58. For the best paper ruling-machine.

59. For same as No. 52 of last session.

60. For the invention of a simple machine, by which plates of cold iron, say 7 feet by 3 feet, and from ⅛ to ¼ inch thick, may be readily cut either lengthwise or across, in equal parts, or in any other proportion that may be required.

61. For the successful application of machinery to the manufacture of the separate parts of cheap clocks.

62. For an account of recent improvements in the manufacture of sugar from beet-root, in Great Britain and Ireland, and of the results obtained.

63. For same as No. 60 of last session.

64. For same as No. 61 of last session.

65. For the best design and working drawings of a model house, suitable to the general requirements of the industrial classes; and of the furniture and modes of fitting such dwellings—with estimates of cost.

66. For the best essay, illustrated by actual experiments, on the fittest material for the walls and ceilings of rooms intended for lectures and similar purposes; and also on the best form thereof.

67. For improvements in the employment of gas for domestic purposes, especially for heating, ventilating, and cooking; with the cost and results thereof.

68. For the application of electricity to the discharge of fire-arms.

69. For same as No. 66 of last session.

70. For same as No. 68 of last session.

71. For the invention of a marine barometer, which shall fulfil all the conditions necessary to make it a good and reliable instrument, and be sold at a moderate price.

72. For the invention of an anemometer, for measuring the force, velocity, and direction of the wind at sea.

73. For a good speculum ani, which, with facility of introduction, shall afford the means of exposing a considerable surface of mucous membrane, and applying escharotics.

CLASSES XI. TO XXIX. — MANUFACTURES.— TEXTILE FABRICS.

74. For an essay on wools—the manner of rearing and feeding the sheep, and improvements in preparing the material for use.

75. For a more economic method of employing gold and silver in woven fabrics.

76. For an account of improvements in the methods of transferring the pattern from the original design to the cards of the Jacquard loom.

77. For the successful application of some new means (as electricity, for instance), for producing ornamental designs in woven fabrics, which shall be cheaper and easier of application than those at present employed.

78. For an account of the methods at present practised in France for dyeing and dressing morocco leather.

79. For the best mode of dressing kid and calf kid, for the upper leathers of boots: the improvements required are, strength of the grain and a good firm black dye.

80. For the best specimen of paper, not less than 1 cwt. produced either wholly or in part from new materials, such materials not being more costly than those now used; with full particulars as to the manufacture.

81. For the best essay on the preparation of paper for India, and hot climates generally.

82. For the best method of colouring paper in the pulp with indigo, and with greens of various hues, the colours not liable to be affected by gas.

83. For improvements in the manufacture of transparent papers.

84. For the best method of glazing paper in the web.

85. For same as No. 74 of last session.

86. For the invention of a means of copying letters, by which the inconvenience at present attending the use of the "style" may be obviated, and both the original and the copy shall be permanent.

87. For same as No. 80 of last session.

88. For the best mode of finishing the edges of machine-made bobbin-lace (in imitation of pillow-lace), so as to supersede the use of a separate pearl edge, usually sewn on.

89. For same as No. 81 of last session.

90. For a ready mode of taking casts of the feet, which may be used as lasts for boots and shoes.

METALLIC, VITREOUS, AND CERAMIC MANUFACTURES.

91. For same as No. 53 of last session.

92. For same as No. 54 of last session.

93. For improvements in letter-locks, which shall prevent the combinations being ascertained by any other means than working out the entire system of changes.

94. For same as No. 84 of last session.

95. For the best specimen of engraving and chasing, in combination with electro-metallurgy, as applied to art-manufactures.

96. For the best specimen of figure-chasing in silver, out of the solid plate, suitable for medallions, vases, &c.; combining good execution and workmanship with taste and judgment in the selection of the design.

97. For the best original design or exact copy of a good piece of ancient glazing in plain glass, in which the lead lines give the geometrical pattern.

98. For the best specimen of a cistern, for household purposes, made of glass in one piece, and capable of holding not less than 80 gallons.

99. For a cheap quality of glass, in which coarseness and want of transparency are not regarded, applicable for drains, water-pipes, sinks, shelves for larders, dairies, &c.

100. For same as No. 90 of last session.

101. For the best specimens of glass for chemical use, capable of resisting a high degree of heat without softening, and not liable to break from changes of temperature.

102. For the best specimen, in imitation of Venetian or ancient glass, of a useful jug, drinking-glass, or dish; every specimen must be left exactly as finished by the glass-blower.

103. For same as No. 93 of last session.

104. For same as No. 94 of last session.

105. For the best copy of some work of Italian art, containing one or more human figures, painted on China, of a superficies of not less than 64 square inches.

MISCELLANEOUS MANUFACTURES.

106. For same as No. 95 of last session.

107. For same as No. 96 of last session.

108. For same as No. 98 of last session.

109. For same as No. 100 of last session.

110. For a means of imparting additional firmness and tenacity to the clay used for modelling, without diminishing its plasticity.

111. For a means of rendering the plaster used for casts less absorbent and more adhesive, so as to facilitate its use for repairing purposes.

112. For the best means of utilizing refuse ores, refuse coal, and impure approximations to coal.

113. For the best means of turning to useful account slag, in a coarse, refined, or combined state.

114. For an account of improved modes of treating and applying India-rubber, or gutta percha, so as to render it less liable to be affected by changes of temperature, or the action of gases.

115. For same as No. 102 of last session.

116. For the best account and collection of specimens of the various materials and processes employed in the production of artificial flowers.

CLASS XXX.—FINE ARTS.

117. For the best specimen of modelling and medal die-sinking. An impression from the die, and the original model to be sent to the Society.

118. For the best design of a flower-trough or vase, ornamented in bas relief, and capable of being cast from a mould in one piece, and of being produced in terra cotta.

119. For the best, cheap set of plain vases in china, earthenware or terra cotta, suitable for mantelpiece ornaments.

120. For the best, cheap set of plain vases in glass, suitable for mantelpiece ornaments.

121. For a table cover showing the best and simplest design, and manufactured in either wool, damask, felted, or oil fabrics.

122. For the most simple and elegant three or five-light gas chandelier suitable for a drawing-room.

123. For a candle lamp showing the best and simplest design, and capable of adaptation to the different sizes of candles.

124. For the best cheap ornamental bracket in one material.

125. For the best cheap ornamental bracket in two or more materials.

126. For the best design for a pair of entrance doors, with open-work cast-iron panels.

127. For the most simple and elegant fender and set of fire-irons.

128. For the best series of four outline drawings in illustration of Longfellow's poem, "Building the Ship."

129. For the best series of four outline drawings applicable to ornamental purposes, and illustrative of acts of mercy.

130. For same as No. 107 of last session.

131. For same as No. 108 of last session.

132. For same as No. 109 of last session.

133. For same as No. 110 of last session.

134. For same as No. 111 of last session.

135. For same as No. 112 of last session.

SWINEY PRIZE.

In pursuance of the will of the late Dr. Swiney, a prize of 100*l.* sterling, contained in a goblet of the same value, will be awarded by the Council of the Society of Arts, to the author of the "Best published

work on Jurisprudence," which shall have appeared before January, 1854. Attention is particularly directed to that branch of Jurisprudence which specially relates to arts and manufactures.

Copies of works intended for competition must be sent in on or before the 31st of December, 1853.

The Society in all cases expressly reserves the power of rewarding each communication in proportion to its merit, or even of withholding the premium altogether. In every case, however, candidates may be assured that their claims will be judged with the utmost liberality.

All communications must be written on foolscap paper, on one side only, with an inch and a quarter margin. They must be accompanied by such drawings, models, or specimens as may be necessary to illustrate the subject. The drawings should be on a sufficiently large scale, to be seen from a distance when suspended on the walls of a meeting-room.

In regard to Colonial produce of all kinds, it is absolutely necessary that a certificate from the Governor, or other qualified person, should accompany the samples sent to the Society, certifying that they really are the produce of the particular district referred to. The samples should be sufficient in quantity to enable experiments to be made, and an opinion to be formed of their quality. Cotton should be sent both in seed and picked. Flax should be accompanied by a description of the culture, the nature of the soil, the weight of the produce per acre, and the extent to which it is cultivated in the particular district. Silk, by a description of the method by which the silkworms were managed; of the kind of trees or plants on which they were fed, and particulars respecting the culture of such trees and plants. Wine, by an accurate description of the vineyards from whence produced. In every instance the maximum extent of the plantation from which the produce has been taken must be stated; with the average yield obtained, and whether similar articles have hitherto been exported from the colony or not, and in what quantities.

All communications and articles intended for competition must be delivered to the Secretary, at the Society's house, free of expense, on or before the 31st of March, 1854. This restriction, as to the date of receipt, does not apply to those articles of colonial produce which were not in last year's list.

Any communication or paper read at an ordinary meeting will be considered as the property of the Society, unless any previous arrangement has been made to the contrary. But should the Council delay its publication beyond twelve months after the date of reading, the author will be permitted to take a copy of the same, and to publish it in any way he thinks fit.

Successful candidates will be communicated with on or before the 14th of June, 1854. Unrewarded communications and articles must be applied for at the close of the session, between the 14th of June and the 5th of July, 1854; after which date the Society will no longer be responsible for their return.

SCREW-PROPELLING EXPERIMENTS AT PORTSMOUTH.

We have been favoured by an old correspondent with the following valuable data, in reference to the late trials on board Her Majesty's screw-yacht, *Fairy*, and steam-sloop, *Conflict*. These trials were instituted more especially to test the merits of Mr. Griffiths's screw and of Sir Thomas Mitchell's bomerang, as compared with the modified common screw. The subjoined data have been obtained from a very able and highly interesting *conversazione*, lately held in the Lecture-hall of the Portsmouth Philosophical Society, by Mr. Spence, of Her Majesty's Dockyard at that port.

It would occupy too much of our space to give, even briefly, the history of the screw, as traced by Mr. Spence, from its earliest infancy to the present day; we must, therefore, content ourselves by laying before our readers the following interesting facts, illustrating the progress of this species of propulsion.

TABLE I. *Her Majesty's Steam Sloop "Conflict," with Common Screw of 15 feet 2 inches pitch, and depth equal 1-6th of pitch.*

Number of Trial.	Revolutions of Engines.	Actual Horse-power Exerted.	Time in Minutes and Seconds.	Speed of Vessel in Nautical Miles or Knots per Hour.	REMARKS.
First Trial.	74	747	M. S. 6·54	8·696	Common screw with 1 foot cut off each corner.
Second Do.	73	752	6·47	8·837	Ditto, with 6 inches additional off each corner.
Third Do...	76·75	788	6·28	9·278	With complete ball, similar to Griffiths's patent.
Fourth Do.	77	784	6·22	9·425	Ditto, with ball not complete at the ends.
Fifth Do...	75·75	812	6·22	9·424	Without ball or sphere.

The first and second trials were instituted to see what effect would be produced by diminishing the surface of the screw; and the results would indicate increased efficiency. The first trial was with the common screw, which had previously been used, but with one foot cut off the corners of each blade. A further reduction was then effected, by cutting off an additional 6 inches from each corner; when, as will be perceived, the speed was still farther accelerated, although the revolutions were diminished.—(For early experiments of this nature, with like results, we refer our readers to page 104 of our xlii. volume.)

The third trial was with a surface the same as in the preceding experiment, but with the addition of a wooden sphere round the boss, in imitation of Griffiths's patent (*vide* vol. xlvii., p. 261), the diameter of such sphere being 4·75 feet; in this experiment the fore and after ends of the sphere were perfect. The fourth trial was a repetition of this experiment, when the sphere had been rendered imperfect. The fifth trial was after the sphere had been unshipped; the screw's surface being the same as in No. 2 trial. It will be remarked, that the speed of the vessel was the same in trials 4 and 5, whilst with the latter the revolutions were decreased 1·25.

TABLE II. *Her Majesty's Steam Sloop "Conflict," with Common Screw, the pitch having been increased from 15 feet 2 inches to 19 feet 10$\frac{5}{8}$ inches.*

Number of Trial.	Revolutions of Engines.	Actual Horse-power Exerted.	Time in Minutes and Seconds.	Speed of Vessel in Nautical Miles or Knots per hour.	REMARKS.
First Trial.	61·5	776	M. S. 6·8	9·772	Screw uncut, length = 1-8th pitch.
Second Do.	62·5	772	6·22	9·428	12 inches cut off each corner.
Third Do...	64·5	776	6·32	9·178	Blades reduced to same surface as Bomerang.
Fourth Do.	66·25	784	6·16	9·571	Same as preceding, but with edges of screw-blade trimmed.
Fifth Do....	66·5	760	6·8	9·772	Same as preceding, but under more favourable circumstances.

The first trial was made with the screw uncut, the length being equal to one-eighth of the pitch, and the surface equal to 46·84 square feet.

Second trial: 12 inches were cut off each corner of the blades, reducing the surface to 38·92 square feet.

In the third and fourth trials the area of the blades was reduced so as to equal that of the bomerang; viz., to 30·916 square feet; but in the third trial the edges of the entering blades were not trimmed.

Fifth trial, same as preceding experiment; but under more favourable circumstances.

TABLE III.—*Her Majesty's Steam Sloop "Conflict," with Sir Thomas Mitchell's Bomerang, diameter* 13 *feet* 7 *inches, pitch* 20 *feet, length* 2 *feet* 10½, *surface* = 30·9.

Number of Trial.	Revolutions of Engine.	Actual Horse-power Exerted.	Time in Minutes and Seconds.	Speed of Vessels in Nautical Miles or Knots per Hour.	REMARKS.
First Trial.	66·5	724	6·37	9·069	With blades or boss.
Second Do.	65½	772	6·16	9·578	Without ditto.
Third Do.	67	799	6·9	9 742	Same as above, only under more favourable circumstances.
Fourth Do.	67·25	799	6·3	9·913	Ditto ditto ditto.

The first trial was with the two small blades on the boss, as shown in fig. 4, page 148 of our fifty-ninth volume. The second trial was with the two small blades cut off. Third and fourth, the same as the preceding; but vessel tried under more favourable circumstances.

TABLE IV.—*Trial of Her Majesty's Yacht "Fairy" with Griffiths's Screw. Nominal Horse-power* 128.

Pitch in Feet.	7·6	8·0	8·6	9·0	9 6	10	12	(1) Speed same as with common screw 12th Feb., with a decrease of 3·5 revolutions per minute, and a diminution of actual power exerted = 20.
Revolutions of Engines.	45·75	41·5	39·25	37·5	35·5	35·25	29	† 1-10th increase of speed revolutions within ·25 of experimental of 12th Feb., but an excess of horse-power = 31.
Actual Horse-power exerted.	476	454	465	438	414	406	352	(2) A diminution of 3·75 revolutions per minute decrease of actual horse-power = 28, whilst vessel's speed decreased only 1-10th of a knot, with much less vibration.
Speed of Vessel in Nautical Miles or Knots per Hour.	*12·8	12·7	†12·5	12·5	(1) 12·4	(2) 12·3	11·6	* An increase of ·4 of a knot over common screw, with an increase of 6·75 revolutions, and an additional power equal to 42 horses, in about 10 per cent. more fuel.

Those of our readers who are not conversant with the principle of Griffiths's patent, we refer to page 261 of our fifty-seventh volume. We have from time to time given interesting details of this invention, and we are now enabled to append the actual horse-power exerted. Before concluding this notice, it may be as well for us to state that the above experiments given in Table 1 were instituted by Mr. Griffiths, to compare the performances of his propeller with the common screw, as fitted to H. M. yacht *Fairy*, of 7 feet 10½ inches pitch, when on trial, 12th February last, with 39 revolutions of engine, under actual horse-power of 434, when she realized a

speed of 12·4 knots. Since this time, a screw of increased pitch (9 feet 10 inches) has been constructed at H. M. Dockyard, at Portsmouth, for the *Fairy*, to enable her to compete with Griffiths's. The result of these experiments, we hope to be enabled to chronicle in a few weeks' time, as also those of the bomerang, in course of preparation for trial in the same vessel.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

George Dowler, of Birmingham, Warwick, manufacturer. *Improvements in boxes for containing and igniting matches.* Patent dated May 6, 1853. (No. 1114.)

Claim.—Separating the igniting mechanism connected with match-boxes from the interior of the said boxes by means of a partition or diaphragm.

Augustus Brackenbury, of Camden Town, Middlesex, gentleman. *Improvements in precipitating the muriate of soda from its solutions in water.* Patent dated May 6, 1853. (No. 1115.)

This invention consists in the direct application of air or gas to the solutions mentioned in the title, whereby the aqueous part is evaporated, and the muriate of soda precipitated. The inventor applies heat direct to the solution, and not to pans containing the solution, as is usual.

John Ryan Danks, and Bernard Peard Walker, both of Wolverhampton, Stafford, cut-nail manufacturers. *Improvements in machinery or apparatus for the manufacture of nails.* Patent dated May 6, 1853. (No. 1116.)

This invention relates to certain mechanical improvements upon the machine ordinarily employed in the manufacture of "cut" nails, by which improvements the blank for the nail is caused to turn over, or become reversed during its descent from the strip of metal from which it is being made. The movement is effected by means of a spring gauge, which is placed upon a swivel joint, and is made to descend through a greater space than the cutter itself, thereby causing the blank to perform a quarter of a revolution during its descending traverse from the crude slip of metal to the grooved dies.

James Egleson Anderson Gwynne, of Essex-wharf, Essex-street, Strand, Middlesex, engineer. *Improvements in the treatment or manufacture of peat and other substances to be used as fuel.* Patent dated May 6, 1853. (No. 1117.)

This invention relates—*First*, to an improved apparatus for effecting the drying of the newly-cut peat or other material, and the mixture or treatment of such to be used as fuel; and, *Second*, to an improved construction or arrangement of mechanism for compressing peat or other fuel. The first part of the invention, which relates to the drying of peat, &c., consists in passing it through a series of inclined cylinders, or hollow rollers, placed one above another, such cylinders being heated by the direct action of a furnace, or any other convenient means. Or in place of inclining the cylinders, their axes may be kept horizontal by employing conical cylinders: but the inventor prefers the former arrangement. Motion is given to the centre cylinders, and is transmitted throughout the series by spur-wheels, or other mechanical arrangements. The material to be dried is conveyed by an endless bucket-chain to the top cylinder of the series, and falls from one to another until it emerges from the last completely dried. The interior of the drying cylinders are fitted with longitudinal ribs at convenient distances, so as to turn over and agitate the material as it passes through the several cylinders. In place of ribs, screw blades may be used, fitted to the interior of such cylinders to force down the material under treatment.

"The second part of the invention consists in compressing the dried peat alone, or in combination with oxides, or ores of metals, small coal, cannel, anthracite, or coke, argillaceous bitumens, or with the bright yellow loam that is saturated with retin asphaltum found in conjunction with the bovey coal, for fuel, by one or more rams actuated by eccentrics, and working vertically over a horizontal revolving table, heated by any suitable arrangement, and furnished with holes or apertures to receive the peat or other fuel, in which holes it is compressed by descending rams. Another series of rams, also actuated by eccentrics, serves to expel the compressed material from the table, as it is brought under them. This material may be combined with bituminous matter, Venice turpentine, coal-tar, solution of glue, linseed oil, gums, flour, dough, or other materials, giving it tenuity, and rendering it capable of being formed into ornamental articles, such as picture frames, mouldings, embossed surfaces, or images, statuettes, or toys, which may afterwards be used as fuel." The inventor purposes producing embossed surfaces by suitably-cut dies, or plates attached to descending rams, which may be heated or not as may be required. For certain articles, two or more dies may be employed, converging upon the article to be pressed or moulded.

John Thomas Stroud, of Birmingham, Warwick. *Improvements in the valves of*

pressure lamps, and in lamp-burners. Patent dated May 6, 1853. (No. 1118.)

Claims.—1. Making the oil-chamber and valves of pressure-lamps of an angular form, without any regard to the number of their angles or sides.

2. A mode of raising and lowering the cotton.

3. A peculiar construction of the cotton-carrier.

George William Jacob, of Dalston, Middlesex. *An improved manufacture of metallic covers or seals for bottles, jars, and other like vessels, and in applying and affixing them.* Patent dated May 6, 1853. (No. 1119.)

This invention consists of manufacturing ornamental covers or seals for bottles and other similar vessels, by casting fusible metal in a mould or matrix which has therein or thereon a pattern, device, figure, type, or design; the covers or seals so produced having Vandyked, pierced, and embossed or lettered sides. The inventor claims the above.

Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, London. *Certain improvements in the manufacture of hat-plush.* Patent dated May 6, 1853. (No. 1120.)

Claim. — The combining horsehair, or other similar tissues, impregnated with gutta percha, with silk, or cotton plush, for the manufacture of hats and other coverings for the head.

Christopher Nickels, of York-road, Lambeth, Surrey. *Improvements in machinery for masticating, kneading, or grinding India-rubber, gutta percha, and other matters.* Patent dated May 6, 1853. (No. 1121.)

Claims.—The combination of apparatus described, wherein two rollers, with teeth or projections, work at a permanent distance from each other.

William Longmaid and John Longmaid, of Beaumont-square, Middlesex. *Improvements in treating waste products obtained in smelting, and otherwise treating ores and minerals, and in producing a valuable product or products therefrom.* Patent dated May 6, 1853. (No. 1122.)

This invention refers to the treating of slags and other waste products in such manner as to produce a hard tough slag, which, when formed into suitable shapes, may be applied as pavement in roads and streets, and for other such purposes; and the invention consists in fusing such slags and products and then mixing them with fluxes when necessary.

Mariano Riera, of Madrid, Spain. *Certain improvements in fire-arms.* Patent dated May 6, 1853. (No. 1123.)

Claims. — 1. An arrangement of fire-arms as described, with a conical breech, and the capability of having the barrel separated from the breech; and the use of a hammer.

2. The application to ordinary fire-arms of a conical breech, and a hammer; also an improved arrangement of the cock.

3. An arrangement for war and sporting projectiles.

4. The application of the inventor's improvements to cannons and field-pieces.

5. A peculiar arrangement of a small field-piece, to which is given the name of "Batidor."

Francesco Capeccioni, of Castle-street, Holborn, London. *Certain improvements in the manufacture of candles.* Patent dated May 6, 1853. (No. 1124.)

The inventor puts in the melted, but not boiling, tallow seven thousandth parts of acetate of lead, and then stirs up the mixture to facilitate the incorporation of the salt with the tallow. After some minutes, he lessens the heat, but keeps it still sufficient to retain the tallow in a liquid state. After which, fifteen thousandth parts of pulverised incense must be thrown into the mixture, and one thousandth of spirits of turpentine. He preserves the same degree of temperature till the salt is completely dissolved, and the insoluble portions of the incense precipitated which generally is accomplished in a couple of hours. The acetate of lead gives to the tallow a degree of hardness superior to that of ordinary tallow; the incense with its soluble part contributes also to this increase in hardness, and gives it a sweet smell. The turpentine modifying the perfume of the incense, makes it very similar to that of wax. The incense and spirits of turpentine give a great brilliancy to the flame.

Claim. — The application of the substances mentioned, and in the manner described to the manufacture of candles.

James Nichol, of Edinburgh, Scotland, bookseller. *Improvements in bookbinding.* Patent dated May 7, 1853. (No. 1125.)

This invention is applicable to the two processes or operations known by the names of "rounding" and "backing," and consists in the adaptation and application to such purposes of a bar or bars of suitable form, which may be made to operate upon the back of the book by means of suitable leverage applied to the bar or bars, the book to be operated upon being held in its position by hand or otherwise. The inventor claims the above arrangement.

Christopher Richard Norris Palmer, of Amwell, Herts, Esq. *A new and improved mode of communicating or signalling between the guards and engine-driver on a*

railway train; also applicable to other purposes. Patent dated May 7, 1853. (No. 1126.

This invention consists in a new means or mode of signalling or communicating between the guards and driver of a railway train, and adopting a new mode of obtaining, conducting, and applying at a distance the motive power of air or condensed air for that purpose, or liquids or elastic fluids, by means of the apparatus after described.

This apparatus in its general form is arranged as follows:—In the guard's box, or on the carriage where he may be seated, is placed a metallic cylinder, called a signalizer cylinder, containing a piston and rod working perpendicularly and air-tight, with a lever handle attached. This cylinder is 15 ins. high by 3 ins. diameter. On the engine or tender, close to the driver, is placed another similar cylinder of smaller dimensions, say 5 ins. high by 2¼ ins. diameter, the two cylinders being connected by a metallic conductor-chain of about 600 feet in length and one-quarter inch diameter. This conductor-chain is made in lengths, which are permanently fixed to the carriages; and the connection between the separate lengths, when the carriages are coupled together, is made by means of common gas union joints, attached to short lengths of India-rubber tubing, fixed at the ends of the metallic parts, and protected externally by a coiled spring; or the connection is effected by means of double union joints, described. The piston-rod of the driver's cylinder is connected to a trigger which strikes a bell, or to the steam-whistle; or it is arranged so as to strike a revolving six-chambered detonator, and thus produce an audible signal; or the cylinder may be transparent, so as to give a visible signal by the motion of the piston therein. This being the arrangement, it will be readily understood that, presuming all the joints to be air-tight, it will only be necessary for the guard to depress the piston in his cylinder to cause the piston at the opposite end of the conductor-chain to rise, and either strike the bell or sound the steam-whistle, or discharge the detonator, so as to attract the driver's attention. This action may be repeated any number of times to indicate particular signals. The inventor suggests the adoption of modified arrangements for working the breaks of railway carriages, and for enabling fog-signals to be set at different parts of a line by those who may be at neighbouring stations. He also proposes to inject compressed air into the guard's cylinder, and thereby give motion to the driver's piston, and consequently produce the signals required.

The claims include the mode or modes of signalling described, and the application of the principle and apparatus, using air gas, or elastic fluids, condensed or non-condensed, as before described as applicable to other purposes, such as signalizing on board ship, in mines, in buildings of all descriptions, at railway stations, tunnels, junctions, and other points of danger.

[The descriptive part of this specification is in many parts by no means so definite as would have been desirable, and the difficulty thus raised is increased by the fact of there being no illustrative drawings accompanying it. The claims, too, are extravagantly general; those above given are considerably condensed, but include, we think, everything embraced by the originals, and very much more than they ought to. Mr. Palmer may consider that he has made an "extraordinary discovery" in applying the motive power derived from the compression of air to signalising purposes; but however new it may be to him, it is by no means so novel to the public. As far as buildings, for instance, are concerned, the world is at liberty to adopt the invention, since the very same arrangements that Mr. Palmer now claims were actually in use by the late Mr H. Murdock, of Soho, more than eight-and-thirty years ago (see *Mech. Mag.*, vol. liii., p. 369); and, for aught we know, still continue in existence. Mr. Palmer would do well, when he next figures as a patentee, to endeavour beforehand to make himself a little acquainted with the labours of previous inventors. He would then spare us the invidious task of divesting him of his borrowed plumage,—a labour, too, which we might doubtless carry out still further, if so disposed. We will, however, but express the hope, that so far as the guard and driver telegraph is concerned, it may be found to answer its intended purpose, the want of some such arrangement having been long and painfully felt. We should hardly have bestowed thus much notice on the invention had not our attention been specially directed to it by Mr. Palmer himself, who, in a communication recently addressed to us, has made the following modest suggestion, that "the discovery should neither be reviewed nor questioned until the editor has caused the facts stated in the specification to be reported upon by some highly scientific gentleman, and by a practical railway engineer also"!! This is rather amusing than otherwise, but we feel little inclination to take the hint, more especially when the novelty of the discovery is so particularly questionable as we have just shown it to be.]

John Pullman, of Greek-street, Soho, Middlesex. *Improvements in the manufacture*

of losh or oil-dressed leather. Patent dated May 7, 1853. (No. 1127.)

This invention consists in mounting the knives and rubbers used, on arms or levers carried on a crank axis, the arms or levers being controlled in their action by connecting rods. The leather is held at both ends, and hangs from the upper end in a curved form, whereby it is free to move and follow the curved direction in which the knives or rubbers move.

HENRY WARNER, manufacturer, JOSEPH HAYWOOD and WILLIAM CROSS, machinists, of Loughborough. *Improvements in machinery used in the manufacture of frame-work knitting.* Patent dated May 7, 1853. (No. 1128.)

This invention consists—*First*, in applying to knitting machines apparatus for stopping the same when thread is not laid on to the needles. The machine goes on working by power so long as thread is correctly laid on to the needles, but immediately the thread is broken, or not laid correctly on to the needles, a lever or instrument is released, and moves away from another lever or instrument which comes in the way of a ratchet-wheel, and is moved thereby, and by its movement acts on the belt-fork, and moves the belt from the fast on to the loose pulley.

And, *secondly*, the invention consists in applying apparatus for stopping a knitting-frame when a determined length of fabric has been produced, and this is done by means of count-wheels, which are caused to rotate by the working of the machine, and when the requisite length has been made the lever before-mentioned is released, and the belt is moved from the fast to the loose pulley.

Claims.—1. The combining with frame-work knitting machines apparatus for causing such machines to stop in the event of a thread breaking, or failing to be properly supplied.

2. The employment of apparatus in combination with frame-work knitting machinery, in order to cause the machinery to stop when a given quantity of work has been produced.

HESKETH HUGHES, of Cottage-place, City-road, Middlesex, manufacturer, and WILLIAM THOMAS DENHAM, of the same place, manufacturer. *Improvements in machinery for weaving.* Patent dated May 7, 1853. (No. 1129.)

This invention consists in weaving fabrics by means of circular machinery, in which the reeds are arranged in sections round a circle, the upper surfaces of which are formed into a circular guide or tramway, on which the bobbin traverses for carrying the weft-thread or threads when more than one bobbin or shuttle are used.

Claims.—1. The general arrangement of machinery, as described.

2. The causing the shuttle or shuttles carrying the weft-thread or threads to revolve by the action of the reeds, or by the crossing and recrossing of the levers.

WILLIAM BOGGETT, of St. Martin's-lane, Westminster, gentleman, and GEORGE BROOKS PETTIT, of Lisle-street, Westminster, gas-engineer. *Improvements in apparatus for heating by gas.* Patent dated May 7, 1853. (No. 1130.)

This invention has for its object the construction of apparatus for burning gas in combination with atmospheric air, in a more efficacious manner than heretofore. These apparatuses are covered on the top with fine wire gauze, or perforated metal, &c., in the manner generally adopted for burning air and gas. When made of a cylindrical shape, the inventors employ several cylinders (in place of one, as formerly) arranged concentrically, and constituting separate chambers, which, being of unequal depth, allow the gas to flow from one into the other.

Claim.—The construction of burners for air and gas, having chambers of unequal depth, so arranged that the gas shall flow from the shallow chambers into those adjoining, as described.

CONRAD WILLIAM FINZEL, of Bristol, Somerset, sugar-refiner. *An improvement in refining sugar.* Patent dated May 7, 1853. (No. 1131.)

This invention consists in melting sugars in vacuo, by which arrangement the melting is effected at a much lower temperature than by any of the processes now followed; the method has also the additional advantages of diminishing the liabilities of damaging the sugar, and of producing a great saving of time.

Claim.—The melting of sugar in vacuo.

GEORGE ENGLAND, of Hatcham Ironworks, New-cross Surrey, engineer. *Improvements in screw-jacks.* Patent dated May 7, 1853. (No. 1133.)

This invention relates to an improved construction of traversing and elevating screw-jacks, and consists in actuating the elevating screws of such screw-jacks by means of combined bevel and spur gearing. To effect this object, a bevel-wheel is formed upon the actuating nut, which is acted on by a second bevel-wheel, which has a spur-wheel formed upon it; a spur-pinion is made to gear with the spur-wheel, and is employed when great power is required. The actuating winch-handle may be fitted either on to the arbor of the second bevel-wheel, when a quick motion is required, or on to the arbor of the small spur pinion when it is desired to obtain a powerful lift. The

jack is traversed laterally by a horizontal screw, or by a rack and pinion acted on by a ratchet handle.

EDWARD BLACKETT BEAUMONT, of Woodhall, Barnsley, York, gentleman. *Certain improvements in the mode of constructing dwelling-houses or other buildings, and in peculiar-shaped bricks and tiles to be used for the purpose.* Patent dated May 9, 1853 (No. 1134.)

Claims.—1. The mode of constructing the roofs of buildings in the form of an arch.

2. The use of strips of sheet metal, or linen, or prepared felt, for rendering the "hipped" joint more secure against the admission of water.

3. A mode of forming gutter spouts and fall pipes, as described.

JOHN FISHER, of Liverpool, Lancaster, engineer. *Improvements in machinery for propelling vessels, and in the mode of manufacturing the same.* Patent dated May 9, 1853. (No. 1135.)

Claims.—1. The making propeller-blades with openings through them for the passage of water, and also, when in combination therewith, the forming the outer ends of the propeller blades with ridges or flanches.

2. The coating of propeller blades with enamel.

DAVID LOW, of Glasgow, Lanark, North Britain, and JOHN INGLIS, of the same place, iron founders. *Improvements in moulding or shaping metals.* Patent dated May 9, 1853. (No. 1135.)

1. The general arrangement and construction of machiney, apparatus, or means for moulding or shaping metals, as described.

2. The mode of moulding or shaping metals by the combined actions of vertical ramming and rotation, or non-rotation of the mould-box, and the feeding-in of the sand, as described.

3. The use in moulding or shaping metals of a reciprocatory traversing rammer, rotatory or non-rotatory, as described.

4. The mode of effecting the continuous reciprocatory traverse action of the moulding rammer by means of a frictional wedging or nippling action, as described.

5. The system or mode of constructing collapsible core-bars by means of folding over lapping sheets of metal, actuated from the interior of the bar.

PETER WRIGHT, of Dudley, Worcester, vice and anvil manufacturer. *Improvements in the construction or manufacture of tew-irons.* Patent dated May 9, 1853. (No. 1139.)

Claim.—Constructing "water tew-irons" of cast-iron tubes of any convenient and suitable forms, and connecting them to the hearth, as described, so as to produce a safe and water-tight joint.

THOMAS QUAIFE, of Battle, Sussex, watchmaker. *Improvements in the manufacture of watches, watch-cases, and in tools and apparatus employed therein.* Patent dated May 9, 1853. (No. 1140.)

The *first* part of this invention consists in forming watch-cases by stamping and pressure in dies, and also in forming the bezels and bands of watch-cases by stamping and pressure, or by draw-plates. This part of the invention also includes several machines for forming and finishing the bands and bezels of watch-cases.

The *second* part of the invention consists in producing the blank wheels of watch movements, and the balance cocks by stamping and pressure in dies. This part of the invention also includes several arrangements of machinery for turning or cutting the screws and pillars of watch movements, and also for finishing and cutting the teeth of wheels and pinions of watch movements.

The *third* part of the invention consists of a duplex escapement, and a lever escapement for watches; in these the patentee slits the balance staff or arbor instead of using a hollow ruby, or other jewel-roller, or in some cases he slits the jewel itself, or uses a jewelled-roller, and so constructs the escape-wheel as to beat full seconds.

PROVISIONAL PROTECTIONS.

Dated August 5, 1853.

1831. William Smith and Thomas Phillips, of Snow-hill, Middlesex, gas-engineers. An improvement in gas-stoves.

Dated August 17 1853.

1926. Thomas Grimsley, of Oxford, sculptor. Improvements in machinery for the manufacture of bricks, tiles, pipes, and pottery.

Dated October 12, 1853.

2350. Charles Scott Jackson, of Cannon-street, City. Improvements in preserving timber and other vegetable matters.

Dated October 25, 1853.

2455. Thomas Summerfield, of Birmingham, Warwick, glass-manufacturer. Improvements in the construction and manufacture of windows.

2457. Jean Baptiste Verdun, of Paris, France, and of South-street, Finsbury, London, gentleman. Improvements in the construction of globes.

2459. John Drumgoole Brady, of Cambridge-terrace, Hyde-park, Middlesex, Esq. An appendage to knapsacks.

2461. Joseph Beasley, junior, of Smethwick, Stafford, iron-master. Improvements in the construction and arrangement of puddling-furnaces, which improvements are also applicable to other furnaces used in the generation of steam.

2463. Alfred Vincent Newton, of Chancery-lane, mechanical draughtsman. An improved construction of printing-press. A communication.

2465. William Bottomley, of North Bierley, Brad-

ford, York, designer and pattern-card maker. Improved machinery for hand and power-loom weaving, and especially applicable to weaving figured, fancy, and checked goods, with any number of picks by Jacquard engines.

2467. Weston Grimshaw, of Mossley, Antrim, Ireland. Improvements in steam boilers.

Dated October 26, 1853.

2469. Edward Austin, of Pembroke-cottages, Caledonian-road, Middlesex, master-mariner. Improvements in surveying and raising sunken vessels, and in apparatus used therein, and in lifting vessels over bars and other obstructions.

2471. Richard Heyworth, of Cross-hall, near Chorley, Lancaster, manufacturer, and Thomas Battersby, of Cross-hall aforesaid, overlooker. Certain improvements in looms for weaving.

2473. Edward Joseph Hughes, of Manchester, Lancaster. Improvements in machinery or apparatus for sewing or stitching.

2475. Downes Edwards, of Ravenscliffe, Douglas, Isle of Man. Improvements in signal apparatus for railways.

2477. Frederick Ludewig Hahn Danchell, of Elm-grove-villas, Acton-green, Middlesex, engineer, and William Startin, of Heathfield-terrace, Turnham-green, engineer. Improvements in obtaining and applying motive power.

2479. Romain Joly, of Gaillon, France, colorist. Improvements in dyeing.

2481. James Thomas George Vizitelly, of Peterborough-court, London, engraver and printer. Improvements in producing plates for printing purposes, by which the manipulatory process of engraving is superseded. Partly a communication.

Dated October 27, 1853.

2482. Amédée François Rémond, of Birmingham, Warwick, gentleman. Improvements in the manufacture of certain kinds of metallic vessels.

2483. Thomas Seal Blackwell, of Cranbrook, Kent, surgeon. Improvements in apparatus for signalizing and stopping railway trains.

2484. Richard Richards, of Paddington, Middlesex, merchant. Improvements in apparatus for indicating water in the holds of vessels.

2485. Thomas Dawson, of King's-arms-yard, London, mechanician. An improved case or cover for umbrellas, which can also be worn as a garment.

2487. William Vaughan, of Stockport, Chester, gentleman, John Scattergood, of Heaton Norris, Lancaster, machinist, and Charles Grimshaw, of Brinnington, Chester, manager. Certain improvements in healds or harness for weaving, and in the method of, and machinery or apparatus for fabricating the same.

2488. Robert Bishop, of Edinburgh. Improvements in steam and water valves.

2489. Henry Dolby, of Regent-street, Middlesex, heraldic stationer. Improvements in embossing-presses.

2491. Jean Martin Adolphe Bayet Lemonnier, of Liège. A new system of weaving by hand.

2492. Edward Loysel, of Rue de Gretry, Paris, civil engineer. An improved coffee-pot.

2423. Joseph Gurney, of St. James-street, Westminster, tailor. An improved mode of treating waterproof fabrics.

2494. Richard Archibald Brooman, of 166, Fleet-street, London, patent-agent. Improvements in the manufacture of coloured and ornamented fabrics. A communication.

Dated October 28, 1853.

2495. Malcolm Maclaren, of Johnstone, Renfrew, North Britain, surgeon. Improvements in fireplaces, grates, or furnaces.

2496. Aristide Michel Servan, of Philpot-lane, London. Improvements in treating phormium tenax, flax, and other vegetable fibrous matters.

2497. John Johnson, of Over Darwen, Lancaster, mechanic. Improvements in looms for weaving terry and other similar fabrics.

2498. John Walker Wilkins, of Ludgate-hill, London, electric telegraph engineer. Improvements in obtaining power by electro-magnetism.

Dated October 29, 1853.

2500. James Nasmyth, of Patricroft, Lancaster, engineer. Improvements in the pistons and piston-rods of steam-hammers and pile-drivers, and in the parts in immediate connection therewith.

2501. Edwin Dalton Smith, of Hertford-street, May-fair, Middlesex. An improvement in the construction of railway carriages, whereby, in the event of collision, the crushing of the carriages will be prevented.

2502. Peter Owen Bernard, of Rood-lane, London, wine-merchant. An improved case or hamper for carrying wine, spirits, and other liquids in bottle.

2503. Richard Archibald Brooman, of 166, Fleet-street, London, patent-agent. Improvements in machinery for dressing flax, hemp, and other like fibrous substances. A communication.

2504. George Joseph Gladstone, of Brunswick-terrace, Blackwall, shipwright and surveyor of shipping. Improvements in apparatus for ascertaining and indicating the depth of water in the hold of a ship or vessel.

2505. Andrew Maclure, of Walbrook, London. Improvements in lithographic printing-presses.

2506. William Betts, of Wharf-road, City-road, Middlesex, gentleman. Certain improvements in machinery for manufacturing metallic capsules.

Dated October 31, 1853.

2507. John Turner Wright, of Birmingham, Warwick, manufacturer, Edward Payton Wright, of Birmingham aforesaid, manufacturer, and William Asbury, of Birmingham aforesaid, engineer. An improvement or improvements in mill-banding.

2508. Joseph Haley, of Manchester, Lancaster, engineer. Improvements in machinery or apparatus for cutting, boring, and shaping metals, and other substances.

2509. Edward Gregson Banner, of Cranham-hall, Essex, gentleman. Improvements in obtaining and applying motive power.

2510. Christian Göethel and Charles Moritz Zimmerman, both of Philadelphia, United States of America. Improvements in stereoscopes.

2511. Felix Paulin Rovère, of Wellington-street, Strand, Middlesex, civil engineer. Improvements in joints for tubular drains.

2512. Perceval Moses Parsons, of Duke-street, Adelphi, Middlesex, civil engineer. Certain improvements in the switches and crossings of railways.

2513. John Gray, of Dublin, medical doctor and newspaper proprietor. A self-acting flushing-apparatus applicable to sanitary purposes.

2514. George Hamilton, of Paisley, Renfrew, North Britain, bleacher. Improvements in spreading or distributing starch, gum, and other semifluid matters.

2515. Anthony Park Conbrough, of Blanefield, Stirling, North Britain, calico-printer. Improvements in printing textile fabrics and other surfaces.

2516. John Brown, of Darlington, Durham, mining engineer. Improvements in the construction of wagons.

2517. Damiano Assanti, of Upper Berkeley-street, Middlesex, gentleman. A new or improved cooling and freezing mixture.

2518. Richard Restell, of Croydon, Surrey, watch and clock-maker. Improvements in warming conservatories, greenhouses, and other buildings.

2519. Celestin Pechoin, chemist, and Eugène Pechoin Barades, soap-manufacturer, both of La

Chapelle, St. Denis, France. Improvements in utilizing the saponaceous matters contained in the waste waters of woollen and other manufactories.

Dated November 1, 1853.

2522. Samuel Lomas, of Manchester, manager. Improvements in machinery for spinning and doubling silk.

2524. Mark Newton, of Tottenham, Middlesex, builder. Certain improvements in the construction of carriages, and in the means of preventing the overturning of the same when horses take fright. A communication.

2526. John Whitehead and Thomas Whitehead, of Leeds, York, machine tool-makers. Certain improvements in cutting-tools, and in the working of iron, brass, and other metals, and wood and other materials.

2528. James Chesterman, of Sheffield, York, machinist. Improvements in hardening and tempering steel, and in grinding, glazing, buffing, and brushing steel and other metallic articles.

2530. Joseph Bauer, captain to His Majesty the Emperor of Austria's 57th regiment of foot, of Vienna, Austria, presently in garrison, at Prague, Bohemia. Cultivating and digging the soil by means of a steam-digging and harrowing-machine.

Dated November 2, 1853.

2534. William Taylor, of Newport Pagnel, Bucks, chemist and soda-water manufacturer. Stopping of bottles containing aërated liquids.

2536. Edwin Dalton Smith, of Hertford-street, May-fair, Middlesex. A new buffer-break for railway carriages.

2538. Edward Ward, of Potton, Bedfordshire, coach-builder. An improvement in carriage-axles. A communication.

2540. Brand Willis and John Musto, both of the East London Ironworks, Mile-end, Middlesex, engineers. Improvements in rotatory pumps.

2544. James Howard, of Bedford, iron-founder. Improvements in horse-rakes and harrows.

2546. Charles Iles, of Peel-works, Birmingham. Warwick. Improvements in metal bedsteads.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," November 11th,* 1853.)

1192. John Browne. Improvements in the construction of chimneys or flues, and in apparatus for increasing draught, consuming smoke, or utilizing the same.

(*From the "London Gazette," November 15th,* 1853.)

1446. Thomas Butterworth. A machine for ploughing land, harrowing, and crushing clods at one operation.

1464. Jules Alexis Adrien Dumoulin. An improved instrument for measuring and tracing.

1477. Auguste Edouard Loradoux Bellford. An improved stove or kiln. A communication.

1479. Henry Bleasdale and Joseph Bleasdale. Improvements in working, tilling, or preparing land.

1488. Thomas Adamson and William Adamson. Improvements in pumps.

1499. Charles Crickmay. Improvements in the construction of fire-arms.

1530. Thomas Weatherburn Dodds. Improvements in the manufacture of files, rasps, and other edge tools usually made of steel.

1555. John Mason and Luke Ryder. Improvements in machinery or apparatus for preparing and spinning cotton and other fibrous substances.

1558. John Jarman. Improvements in apparatus for measuring corn, pulse, seeds, or other produce usually sold by dry measure.

1596. François Mathieu de Amezaga. A method of obtaining motive power, and certain machinery or apparatus employed therein.

1608. Peter Erard. Certain improvements in steam boilers.

1669. William Needham and James Kite the younger. Improvements in machinery and apparatus for expressing liquid or moisture from substances.

1715. John Robison. A new or improved apparatus for making tea and coffee, and other infusions or decoctions for chemical and other purposes.

1758. Thomas Buxton. An improved mill for grinding.

1769. Charles Cummins. Improving clock-escapements.

1867, Joseph Bacon Finnemore and Edwin Daniel Chattaway. Improvements in apparatus for ascertaining or registering the number of persons travelling by omnibuses or other vehicles, or who may have entered in or passed by, out of or through any particular place, vehicles, or building during any given period.

1888. William Littell Tizard. A new combination or new combinations of materials suitable for buildings and other structures, and parts thereof, and machinery for producing the same.

1910. Archibald Douglass. Improved machinery for stitching, backstitching, and running.

1926. Thomas Grimsley. Improvements in machinery for the manufacture of bricks, tiles, pipes, and pottery.

2192. Peter Rothwell Arrowsmith and James Newhouse. Certain improvements in machines for spinning and doubling.

2263. Henry Jacob Jordan. An improved medicine for the cure of venereal affections, which he denominates "the Treisemar." A communication.

2270. James Lee Norton. Improvements in instruments or apparatus for measuring and indicating the distance travelled by carriages, and in the means of transmitting motion thereto from the running wheels.

2308. George Lifford Smartt. Improvements in vessels for preserving leeches and fish alive.

2331. James Hall Nalder and John Thomas Knapp. Improvements in winnowing or dressing corn,

2350. Charles Scott Jackson. Improvements in preserving timber and other vegetable matters.

2392. Capper Pass. Improvements in the manufacture and refining of copper.

2423. John France. An improved morticing-machine.

2429. John Henry Johnson. Improvements in apparatus for sustaining bodies in the water. A communication.

2437. Samuel Lloyd, the younger. Improvements in the construction of turntables.

2440. Frederick Albert Gatty. Improvements in printing or producing colours on textile fabrics.

2458. John Fordred and Thomas Boyle. Improvements in daylight reflectors, and in apparatus to be used in connection therewith.

2469. Edward Austin. Improvements in surveying and raising sunken vessels, and in apparatus used therein, and in lifting vessels over bars and other obstructions.

2470. George Gower Woodward. Improvements in the manufacture of carpets.

2471. Richard Heyworth and Thomas Battersby. Certain improvements in looms for weaving.

2477. Freiderich Ludewig Hahn Danchel and William Startin. Improvements in obtaining and applying motive power.

2489. Henry Dolby. Improvements in embossing presses.

2493. Joseph Gurney. An improved mode of treating waterproof fabrics.

2506. William Betts. Certain improvements in machinery for manufacturing metallic capsules.

2508. Joseph Haley. Improvements in machinery or apparatus for cutting, boring, and shaping metals and other substances.

2515. Anthony Park Conborough. Improvements in printing textile fabrics and other surfaces.

2528. James Chesterman. Improvements in hardening and tempering steel, and in grinding, glazing, buffing, and brushing steel and other metallic articles.

2536. Edward Ward. An improvement in carriage-axles. (A communication.)

WEEKLY LIST OF PATENTS.

Sealed November 11, 1853.

1167. Edmund Whitaker and James Walmsley.
1169. George Bell.
1200. Stephen Garrett.
1371. William Edward Maude.
1617. William Edward Newton.
1789. John Carvalho de Medeiros.
2047. Thomas Bollman Upfill and William Brown.

Sealed November 12, 1853.

1177. Julian Bernard and Edward Taylor Bellhouse.
1188. John Knowles and Edward Taylor Bellhouse.

Sealed November 14, 1853.

903. William Laycock.
1197. William John Warner.
1201. Peter Armand Lecomte de Fontainemoreau.
1202. Peter Armand Lecomte de Fontainemoreau.
1209. Robert Boyd.
1220. Charles Cowper.
1243. John Thornborrow Manifold Charles Spencer Lowndes and John Jordan.
1263. Samuel Alfred Carpenter.
1309. William Wolfe Bonney.
1329. Julian Bernard.
1370. William Edward Maude.
1541. John Henry Johnson.
1615. Robert Anderson Rüst.
2002. Peter Armand Lecomte de Fontainemoreau.

Sealed November 16, 1853.

658. John Ashenhurst.
1206. Jean Jacques Joseph Jamin and Alexander Symons.
1733. George Spencer.
1780. George Katz Douglas.
1870. Richard Farmer Brand.
1897. John Perkins.
1920. Alfred Vincent Newton.
2016. Astley Paston Price.
2023. Henry Jeremiah Iliffe and James Newman.
2070. William Hall.
2121. William Smith.
2136. George Spencer.
2149. Sydney Smith.
2203. Hiram Tucker.
2205. William Farmer.

Sealed November 17, 1853.

1215. John Lee Stevens.
1217. James Thomas George Vizettelly and Henry Richard Vizettelly.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1581.] SATURDAY, NOVEMBER 26, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

WILKINS'S PATENT STENO-TELEGRAPH.

Fig. 3.

Fig. 1.

Fig. 2.

Fig. 4.

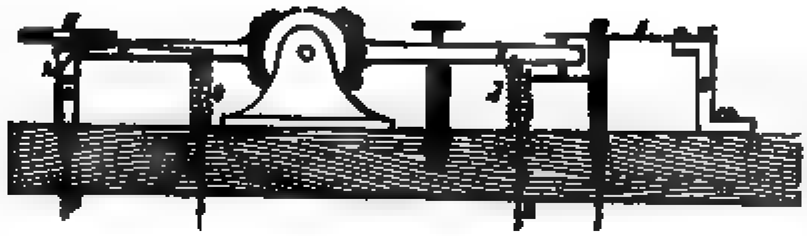


Fig. 5.

WILKINS'S PATENT STENO-TELEGRAPH.

(Patent dated January 13, 1853.)

After Œrsted's discovery of the action of electric currents upon magnetic needles, the invention of electric-telegraphs was a comparatively simple matter. There is, nevertheless, considerable scope for the employment of electrical and mechanical skill in improving the methods of effecting communication. The present invention of Mr. Wilkins is characterized by several features which commend it strongly to public favour. One advantage connected with it is that a message may be simultaneously sent to any number of towns, without the aid of intermediate operators, and only one of these is required at each instrument, so that the expense of working it will be only one-half of that of the present methods. It will also be seen, from the following description of the apparatus, that it is constructed so as to transmit messages with a rapidity much greater than has ever hitherto been attained, and to insure unprecedented accuracy. As a powerful Company is already formed for carrying out Mr. Wilkins's invention, it is certain that the public will shortly experience the benefit of the above improvements, by the establishment of a general system of cheap and rapid telegraphic communication.

The invention consists in the arrangement of electric telegraph apparatus in such manner as to give motion to a marker or tracer, held continuously in contact with a moving recording surface, and thereby to mark or produce upon such surface characters or signs indicating letters, words, or figures connected together in a continuous line. The following description of the accompanying engravings extracted from the patentee's specification, will serve to show more fully the nature of the arrangement:

"Figs. 1, 2, and 3 represent in plan and elevation an arrangement for giving motion to a marker or tracer, so as to produce characters or signs on a moving recording surface. 1.1, 2.2, are electro-magnets, having an armature, A B, mounted between their opposite poles. H is an arm or lever, fixed at one end to the armature, and moving with it when the armature is caused to vibrate between the poles of the magnets. The arm or lever, H, seen in the figure from above, or in plan, has a marker or tracer, L, fixed to its free end, and this marker or tracer is caused, by means of a spring or otherwise, to be in contact with and press against the paper or other material used for receiving the impression, and it is by the movement of the armature, A B, conveyed to the arm or lever, H, and consequently to the marker or tracer, L, which is in contact with the recording surface, together with the movement of such surface, that the peculiar form of the characters or signs is obtained.

The electro-magnets, 1.1, 2.2, are formed in the usual way, by winding insulated wire round a soft iron core, and the coils composing the magnets are connected in pairs by the pieces, M M, of soft iron, which again are connected by the cross piece, G, which latter serves as part of the magnets, and also to hold the pair of magnets in their relative positions. The armature, A B, may be either a permanent or electro-magnet, or composed of soft iron. It may also be employed as the marker or tracer without the intervention of other apparatus; but I prefer to have a marker attached. When a current of electricity, however obtained, is made to pass through the coils of the magnets, 1.1, (the wire of which is wound so that the extremities, D C, of the iron cores shall, when magnetized, be of opposite polarities,) the armature, A B, whether a permanent magnet or soft iron, will be deflected on its centre, Q; that is to say, if a permanent or electro-magnet, it will be attracted at each end by its presenting contrary poles to those made in the electro-magnet, 1.1; or if of soft iron, the movement will be similar. By this deflection or motion of the armature, A B, the extremity of the arm, H, will be moved in the direction of the arrow, O, and held in that position so long as the same current is passing in the same direction through the coils of the electro-magnet, 1.1. In a similar manner, when the current of electricity is passed through the coils of the magnets, 2.2, the extremity of the arm, H, will also be moved, but in the opposite direction, or in that of the arrow, N, and will be held there so long as the current is passing. A like result would be produced if the armature, A B, were a magnet or electro-magnet, and both magnets, 1.1, 2.2, were used at the same time, in which case it would only be necessary to arrange the wire on them, so that while one of the magnets used was attracting, the other should be repelling the armature, the reverse being the case on reversing the current of electricity.

The method adopted in this arrangement of producing signs and characters from the motion of the armature is by causing the recording surface to pass between the marker, L,

fixed on the end of the arm, H, and a roller or other surface, K, seen in section in the engraving, which may be inked, and the ink will be transferred to the paper or other material used, by simple pressure of the arm and marker; or a pencil, pen, or other point may be attached to the arm, H, so as to mark directly on the paper or material used. I prefer the recording surface being in the form of a narrow slip or strip of paper, &c., which is caused to move between the marker or tracer, L, and the roller, K, by means of clockwork, arranged so as to give motion to a receiving-drum, on which the said paper, &c., is wound, and by which it is drawn at any required speed, passing under the marker or tracer in its course. As the marker or tracer is always pressed into contact with the travelling slip of paper, a continuous straight line will be produced on it, when the magnets, 1.1, 2.2, are not in action; but when a current of electricity is sent through either of the electro-magnets, 1.1, 2.2, and the marker caused to move to one side or the other, a corresponding diversion or deviation of the line drawn by the marker will take place; and after such deviating line, and as long as the current continues to pass through the electro-magnet, a straight line will be produced in a direction parallel to the original straight line before mentioned; and when the current is broken, the armature and marker will return to their former position, the marker being all the time in contact with the paper, and thus producing a continuous line. By reversing the current of electricity, the marker will be moved aside in the opposite direction, and lines will be produced, deviating from the normal straight line in the contrary direction to those before produced. By combining two, three, five, or more of the marks thus produced in different positions, signs or characters will be obtained, which may be the representatives of letters, figures, or words. Such combinations of lines may be varied in the case of any particular letter or number, and similar combinations may be also adopted to indicate words of frequent occurrence.

Fig. 6.

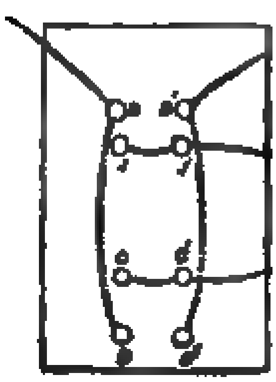


Fig. 7.

For the purpose of sending positive and negative currents of electricity upon lines of telegraph to work one or more of my telegraphic instruments, such as described in the same electric circuit, I employ the arrangement of keyboard shown in figs. 4, 5, and 6 of the engravings. By tracing the course of the current as it would flow from the positive and negative poles of a galvanic battery, or other source of electricity, when either of the keys, E E^1, are pressed down, it will be seen that a current of electricity will be sent in a given direction through one wire, say "line wire down," and at the same time it will return through "line wire up," and the direction of such current will be reversed on depressing the other key and releasing that which had been previously depressed, so that

to send a positive current alternately through the same wire in different directions it is only necessary to press down the keys, E E^1, alternately, so as to make contact with the brass stops, D D^1. Thus when the key E, figs. 4 and 5, is pressed down so as to make contact between the metal, F, and the metal, D, at the point, L, the screw, K, at the end of the lever, F H, will raise the spring, A, and break its contact with the pin, B, at the point, M; and when this is done while the negative current of electricity is passing through the spring, G, figs. 4 and 5, to the metallic lever, F, and thence to D, and through a conductor, D B, (fig. 6,) to "line wire down," the other current will be passing through the spring, J to H, and through the screw, K, and spring, A, to the bracket, C, and thence through the spring, A^1, and pin, B^1, to "line wire up." So also when the key, E^1, is pressed down so as to make contact with the stop, D^1, the one current will pass along "line wire up" while the other current will follow "line wire down." By means of this arrangement or key-board, which can be acted upon, if required, by magnets instead of manual operation, I am enabled to bring into action batteries or other sources of electric power so as to work other circuits; that is to say, I can work the first key-board of the series by manual operation, and then through the intervention of electro or other magnets, work another similar key-board or key-boards, which may be made to work other circuits, and so on *ad infinitum*.

For the purpose of facilitating the working of the recording apparatus hereinbefore first described I employ, as well as key-boards, as before described, an arrangement of apparatus which I term the "Automaton repeater." This instrument in one telegraph circuit is used for the purpose of bringing into operation currents of electricity to work telegraphs or telegraph circuits, whether short or long, or other instruments, or other extended circuits working or connecting other telegraphs, which telegraphs or extended circuits can be made to work other "Automaton repeaters" to any extent and through any distance.

The "Automaton repeater" arranged according to my invention, is represented in fig. 7. W A W is an electro-magnet, A representing the iron core, and WW the wire coiled on it. B B are fixed permanent or electro-magnets,and *b b* pendant continuations of such magnets formed of soft iron or steel, or other metal magnetizable by induction or otherwise, preferring the former, and moveable at the pivots or hinges, C C, placed so as to be very near the poles of the magnet, W A W. Now if a current of electricity be sent by means of the key-board last described through the magnet, W A W, by pressing one of the keys described, and completing the circuit through a galvanic battery or magneto-electrical machine, the core, A, will be rendered magnetic with opposite poles; and if the magnets have been so magnetized that the pendant poles, *b b*, are like poles, that is, both positive or both negative, then one of them will be attracted to the iron core, A, and the other repelled from it.

In order to attract that pendant pole which was before repelled, and to repel that which was attracted before, it is only necessary to reverse the current of electricity through the wire, W W, and the iron core, A, becomes magnetized in reverse directions, whence the pendant poles, *b b*, remaining the same, it follows that the pole which was before attracted will now be repelled, and *vice versâ*.

"I make use of this alternate motion of the moveable parts, *b b*, of the magnets, to bring into operation galvanic or other electric power, so arranged that, upon causing one of the pendant or moveable poles of the magnets to come in contact with another portion of the apparatus, as shown at the extremities of the core, A, of the magnet, W A W, a circuit is completed which may be employed to work other circuits and other instruments, and also to work the magnets of the recording instrument, first hereinbefore described."

ON THE APPLICATION OF AIR-CHAMBERS TO PUMP SUCTION-PIPES.

To the Editor of the Mechanics' Magazine.

SIR,—I have waited several weeks in expectation that some more competent writer would supply the information relative to the application of air-chambers to the suction-pipes of pumps, requested by your correspondent, "Hydraulicus," at page 247 of your 1579th Number.

In the "Report of the Juries," Exhibition, 1851, at page 178, there appear the following remarks, by the Rev. H. Moseley, reporter to Class V., upon the subject in question:

"A remedy for some of the evils (previously enumerated) in the working of a pump has been sought in the application to it of a second* air-vessel, communicating

* There may be, and usually is, no first.—W. B.

with the suction-pipe immediately below the barrel, or with the top of the suction-pipe and the bottom of the barrel. The commencement of each stroke is eased by a supply of water from this air-chamber to the space beneath * it. The influx of the water into that space is aided by the pressure of the condensed † air in the air-chamber, and when the stroke is completed, the state of condensation of this air (?) is, by the momentum of the water in the suction-pipe, restored, causing it to rush through the passage by which that pipe communicates with the air-chamber. Thus, by this contrivance, the surplus work, or half the *vis viva*, which remains in the water of the suction-pipe at the conclusion of each stroke is stored up in the compressed air of the air-chamber, and helps to begin the next stroke of the piston. The suction air-chamber has been added to a common suction-pipe, exhibited by Mr. Self, in the agricultural department, where, being made of glass, its action was readily to be seen. It is also introduced in a class of small pumps, called 'fire-syringes,' exhibited by Mr. Baddeley, ‡ and Messrs. Shand and Mason.* Except in the case of the Canadian engine, it does not, however, appear to have been applied to any of the larger classes of engines exhibited.† 'It should probably be constructed of much larger dimensions than have been given to it in either of these engines'!!! When the high character of the jurors, and the well-known talents of their reporter is considered, it is a matter of unfeigned regret that the report upon the highly-important subjects contained in Class V. of the Great Exhibition should have been so meagre in its character, and display throughout such an evident want of care in its preparation. Sins of omission and of commission abound. Of five exhibitors, honourable mention is made in the body of the Report (page 179); but not being included in the tabular list of awards, no publication of the fact ever took place, as in other classes, nor were these exhibitors aware of the distinction intended to be conveyed until they received a copy of the "Juries' Report," long after the Exhibition closed!

Herewith I send two sketches of common suction-pumps, fitted with an air-vessel upon the feed-pipe. A is the pump-barrel; *b*, the bucket; *c*, the lower pump-valve; *d*, the pipe leading to the air-chamber E: *f* is a second valve on the upper part of the pipe *g*. We may suppose the difference between the two water-levels (that is, in the well and the pump) to be about 20 feet. When the pump is first worked, its operation will be to partially exhaust or rarefy the air in all the passages between the

* *It may be above.*—W. B.

† There can be no condensed air in that arrangement.

‡ Described in *Mech. Mag.*, vol. liv., p. 306.

* Described in *Mech. Mag.*, vol. lii., p. 290. But in neither of these contrivances is any suction-chamber employed!

† Another notable mistake.

pump-bucket and the water, until it is about one-third of its original density; say equal to a pressure of about 5 lbs. upon the square inch. As this point is approached, the water rises to the pump, occupying the whole of the passages, *g*, *d* and A, and a portion (about two-thirds) of the air-chamber, E, its upper part being occupied by rarefied air of the density before stated. If the relative proportions of the pump and feed-pipe, and the speed at which it is worked, are such that the power expended at every stroke is just sufficient to bring the water raised to rest at the end of each stroke, no practical benefit will result from the employment of the air-vessel. But if the dimensions of the pump barrel and feed-pipe differ considerably, and the pump is worked so fast as to produce a considerable initial velocity of the water in the feed-pipe, then the air-chamber comes into useful operation. The *vis viva* (momentum)* of the water will cause it to rush into the air-chamber, E, increasing relatively the density of the air, but never, or rarely, reaching atmospheric equilibrium, much less condensation! On again raising the pump-bucket and exhausting the barrel, a portion of the water is drawn from the air-chamber, E, and the air above it attenuated, when the column of water in the feed-pipe *g* is set in motion, supplying the requirement of the pump-barrel and expending its *vis viva* in a surplus supply to the air-chamber, and so on continuously. "The nature of this action," says the writer before quoted, "will be best understood from that of the hydraulic ram. The contrivance constitutes indeed, in some respects a union of the action of the ram with that of the pump; and, besides accomplishing the object for which it was applied, appears to have the effect of considerably economising the power employed in working pumps." The difference is, that in the suction air-chamber the air is rarefied, that is, less than atmospheric pressure; whereas, in the hydraulic ram, the air is in a state of condensation considerably greater than atmospheric pressure.

In the case of the fire-engine from Canada, the jurors commend "the large proportion of the sectional area of the suction-pipe to that of the barrel;" as also "the application of an air-chamber to the suction-pipe," which the large proportion of the former rendered needles, and the absence of a valve rendered inoperative. The same remark is applicable to another engine exhibited, but not specially noticed in the Report.

I am, Sir, yours respectfully,

Wm. Baddeley.

13, Angell-terrace, Islington, Nov. 9, 1853.

[* *Vis viva* and momentum are not equivalent terms.—Ed. M.M.]

THE LATE PORTSMOUTH CENTRAL SCHOOL.

The maxim, "Silence is better than speech," is one which the supporters of a weak cause would always do well to regard, but which Mr. Fincham, and his ill-informed champion, the writer of the *Mining Journal*, have, unfortunately for themselves, set at nought. The latter gentleman has now retired from the field, but before doing so, however, introduced Mr. Fincham himself. We shall not, therefore, consider ourselves as having any further dispute with our contemporary, especially since its final article contained no attempt to reply to our last remarks in any other way than by asserting its own purity, and expressing its (very natural) surprise and regret at the stubborn character of our observations. That facts are stubborn things is not our fault, and the *Mining Journal* is, as all men know, not the first discoverer of the truth. Let us just say, however, that the writer of the *Mining Journal* would render Mr. Rawson much greater service, or rather, he would do him much less injury (and he seems to be anxious to serve him at any cost), if he would first acquaint himself with the amount of merit that really attaches itself to Mr. Rawson as a scholar, and then bestow upon him prudent and suitable praise, instead of indulging in idle and stupid adulation as he has hitherto done; first, by proclaiming him one of "Nature's Nobles," and then by comparing him with Dr. Woolley. We do not profess to know the extent of Dr. Woolley's attainments, nor is it necessary that we should, in order to point out the folly of such a comparison, since the *Mining Journal* alludes to him as a "mathematician of a very high standing." It is only necessary, therefore, to show that this Mr. Rawson is not, and we have often done that before. Now, does not the writer of the *Mining Journal* know that a mathematician's abilities are capable of being determined by an appeal to his productions? and, moreover, that for a mathematician to fail in elementary matters, is to prove himself unworthy of confidence? If so, that writer should try to deliver Mr. Rawson from a now general want of credit, by proving that his "Screw Propeller" betrays no evidence of scientific unsoundness, and no proof of inability to apply mathematics to physical problems. Indeed, we need only say that Mr. Rawson's condemnation as a mathematician is elaborately extant in our pages; we shall be glad, for his sake, if any one can supply us with his vindication. If not, it is only puerile to talk of him as a mathematician of a very high standing.

The *Mining Journal*, in its last article also alludes to Mr. Rawson as a "pure mathematician." This may be a prudent step, inasmuch as it is calculated to divert attention from known practical deficiencies: but the writer exhibits throughout so small an acquaintance with mathematics and mathematicians, that it is more than probable that we should only misunderstand his meaning if we interpreted the term, "pure mathematician" accurately; we cannot, therefore, reply in this matter. We were surprised that the *Mining Journal* had been so foolish as to exhibit the weak spleen betrayed in the words, "We may also be permitted to say, that it is Dr. Woolley's school, at Portsmouth, which is abolished as useless, *not* Mr. Rawson's." Of course it was Dr. Woolley's school that was abolished, though not as *useless*, but as inefficient in Mr. Fincham's department of it, *and in that only!* The very ground of our original complaint was, that through the proceedings of Mr. Fincham, as we conceived, the entire Institution was annihilated. Of course, also, Mr. Rawson's school was not abolished. It had nothing to do with the matter. Moreover, since Mr. Rawson's is but one of many Dockyard schools,—all formed for carrying out the educational measures of the Admiralty,—it was not likely to be abolished. If that were found not to answer, their Lordships would by no means abolish it, but abolish Mr. Rawson, since none but he could have injured it. This case, however, leads far from the present question, and we are not careful therefore to pursue it. Nor are we anxious to guard Dr. Woolley from any attempt at detraction that may possibly be contained in the above sentence of the *Mining Journal*. That gentleman is known to us as a mathematician of a high and unblemished reputation, and as a very valuable and esteemed correspondent, to whom we are indebted, as our readers are aware, for several important contributions on the theory of Naval Architecture, and the practical application of Mathematics to the calculations employed in the construction of ships; but beyond this he has no relation to us, nor we to him. Still, we certainly regret that in the present discussion, we should have been instrumental in bringing his name into such connection as it appears we have. We could not, however, out of respect for Dr. Woolley, or for any one else, refrain from expressing ourselves upon what we conceive to be a public wrong, and one that was especially calculated to hinder the development of an important science in this country.

Let us now turn to Mr. Fincham's letter. He says, while speaking of the abolition of the late school, "The fact is, which I have abundant documentary evidence to prove, that the 'real cause' of that abolition was the simple circumstance that the Institution as conducted did not answer the purpose for which it was intended; and I had no more to do with its suppression than may have resulted from my conscientious reports to the admiral superintendent, which I was called upon to make, after examination of the students in practical shipbuilding, in my capacity of master shipwright. In my report in June, 1851, I pointed out that the time consumed in the studies of the school was too great to allow the students to apply in practical ship-building their theoretical acquirements; and I specially stated in reference to those young men whom I was compelled to place below the required standard, 'I cannot, therefore, impute the partial failure of these young men to a want of attention, but rather to a deficiency of time allowed to them for this part of their studies.' Those who had sufficient natural ability could overcome the disadvantages under which this system placed them, but those who were of inferior capacity were unable to compass all that was required of them."

Several important conclusions may be drawn from this statement, but how Mr. Fincham can put it forth as a sufficient vindication of his measures we are at a loss to discover. The first impression a person would feel upon reading it would undoubtedly be, that the Admiralty had disgraced the students, not for inattention, but because there had been "a deficiency of time allowed them" for the practical part of their studies; that is, because of the defects of their own arrangements. So far Mr. Fincham displays some ingenuity, but only releases himself by imputing glaring injustice to the Lords of the Admiralty. But then he does not explain why he kept back the fact, that the time allowed the students for practical studies was insufficient, until he had placed all who were first to quit the college below his required standard. Nor does he account for his concealing from the students his determination to finally disqualify them, unless they applied themselves to practical studies with greater diligence. And these are the gravest points of all, for it is plain from these, that when he saw them suffering from adverse arrangements, and had himself the entire charge and control of their studies in ship-building, he carefully withheld from them the fact which would probably have excited them to larger exertions, and so have ensured them success, and also forebore to make the smallest effort to improve their opportunities.

Finally, Mr. Fincham adds (after characterising our statement of facts as "a mere quibble of words") the following justification of the *Mining Journal's* statement, that

he, Mr. Fincham, did not know Mr. Rawson till six months after the establishment of the school. He says, "The central school in question *was* established more than six months before Mr. Rawson came to Portsmouth Dockyard, and thereby became known to me. Indeed, Mr. Griffin received his appointment some days before Mr. Rawson was in any way connected with the Dockyard. The school was formed, but not brought into operation, because Mr. Griffin threw up the mastership without having acted, and the boys were soon after, as stated, placed temporarily under the care of Mr. Rawson, till the appointment of the Rev. Dr. Woolley." We will not spend many words in pointing out the nature of these assertions. Mr. Rawson joined Portsmouth Dockyard early in January, 1848; the first pupils that ever were sent to the Central School went to Portsmouth in May, 1848. Now Mr. Fincham says, "the Central School in question *was* established more than six months before Mr. Rawson came to Portsmouth Dockyard." The conclusion is, that the school was established nearly six months before any principal was appointed, and nearly a year before any pupils were sent. Now what, in the name of reason, can such an establishment of the school as this must have been have had to do with the subject in hand? When we spoke of the establishment of the school, we alluded, as Mr. Fincham must have observed, to its *actual* formation, as was stated in our previous article. We are willing to let others judge who is the quibbler in the matter. Our position remains unassailed; namely, that Mr. Fincham did know, and was favourable to Mr. Rawson before, and some months before, the actual principal was appointed to the Central School.

INSTITUTION OF CIVIL ENGINEERS.

Sittings of November 15*th and* 22*nd*, 1853.

The discussion upon the Paper on "Ocean Steamers," by Mr. Andrew Henderson, Assoc. Inst. C.E., was commenced by quoting from an article in the *Edinburgh Journal*, by Professor Tennant, of St. Andrews, the dimensions of some of the large ships built by the ancients; whence it appeared that a ship, constructed by Ptolomœus Philopater, was 420 feet long, 56 feet broad, and 72 feet high from the keel to the prow; and was manned by four thousand rowers, four hundred servants, and two thousand eight hundred and twenty marines. Hiero, King of Syracuse, caused to be built, by Archias, the Corinthian shipwright, under the supervision of Archimedes, a vessel which appeared to have been armed for war, and sumptuously fitted for a pleasure yacht, and yet was ultimately used to carry corn; the dimensions were not recorded, but as there were twenty banks of oars, and three masts, —the timber for the mainmast, after being in vain sought for in Italy, being brought from England,—and the cargo was sixty thousand measures of corn, besides vast quantities of provisions, &c., for the crew, the dimensions must have exceeded those of any ships of the present day; indeed, Hiero, finding that none of the surrounding harbours sufficed to receive his leviathan, loaded it with corn, and presented the vessel, with its cargo, to Ptolemy, king of Egypt; and on arriving at Alexandria, it was hauled ashore, and nothing more was recorded respecting it.

Taking these dimensions as the basis for calculating the tonnage, by the old law, or builders' measurement, and, in accordance with the report of the late Tonnage Committee, taking the average tonnage of ships as amounting to twenty-seven hundredths of the external bulk, measured to the medium height of the upper deck, the burthen and cubic content of these vessels will be—

		Tonnage.	External Bulk.
Ptolomœus Philopater's ship	=	6,445 tons,	830,700 cubic feet.
Noah's Ark . . .	=	11,905 „	1,580,000 „

and contrasting with these a few modern ships:

Great Western . .	=	1,242 tons,	161,100 „
Great Britain . . .	=	3,445 „	446,570 „
Arctic (American packet)	=	2,745 „	356,333 „
Hymalaya	=	3,528 „	457,232 „

and, calculating by the same rules, taking the dimensions given in the prospectus of the Eastern Steam Navigation Company, their

Proposed iron ship . .	=	22,942 tons,	2,973,593 „

It was, however, stated that this vessel was intended to be 10,000 tons register, which might be correct, if it was built on the cellular system, and was measured internally, by the present law. This latter example was only given to demonstrate the

advantage of adopting the proposed system of using the mean of external and internal measurement as the basis of the calculation of the tonnage, and of recording all the dimensions, and the scale of burthen on the certificate of survey.

It was admitted that there was much ingenuity in the proposed system of descriptive measurement, but it was argued that the present law rather favoured the construction of well-formed vessels, as the fiscal tax fell lighter upon them than upon bad ships. The utility, in a scientific point of view, as well as commercially, was strongly urged, of adopting a system of measurement which should record the dimensions, capacity, and scantling, and form a classification of the comparative merits of all ships.

It was suggested that the discussion would be more useful if it was, for the present, confined to the consideration of the advantages and disadvantages of the proposed large classes of sailing-ships and steamers, with respect to their scientific construction, their capabilities for navigation, and their commercial economy, as the law of measurement could scarcely be combined with these questions.

The first point then considered was, the effect of heavy seas upon vessels of 400 to 600 feet long. The waves of the Atlantic were stated, by some captains of American "liners," to attain an elevation of about 20 feet, with a length of 160 feet, and a velocity of 25 to 30 miles per hour. Dr. Scoresby, in his paper on Atlantic Waves, gave about the same mean elevation for the waves in rather a hard gale ahead; on one occasion, with a hard gale and heavy squalls, some few waves attained a height of 43 feet, with a length of nearly 600 feet, and a velocity exceeding 30 miles an hour. Other authorities assumed even more than those heights and distances.

The amount of strength, to resist the impact of such waves, must vary with the length and size of a ship, and the materials of which it was constructed; and as the experience of the Britannia-bridge showed, that a weight of 460 tons, at a velocity of 30 miles per hour, could be borne by a cellular tube of 460 feet span, it was demonstrated, that by the use of iron, almost any amount of strength could be given to a vessel, and as stability could be imparted by proper proportions, efficient vessels could be built of any dimensions, as had been exemplified by the *Great Britain*, which after remaining ashore on rocks for several months, had been got off without serious injury. There were, however, objections to the use of iron alone for vessels, therefore many other systems had been essayed, such as all English oak, pine of large scantling, three thicknesses of diagonal planking, and iron framing with stout planking; this last combination, with the addition of fore-and-aft ties and watertight bulkheads, was advocated for efficiency and economy.

The proportions of about six breadths for the length, were insisted upon; and it was noticed, that these were given as the dimensions of Noah's Ark, as recorded in Holy Writ.

The effect of heavy waves upon vessels of great length was discussed, particularly when in the trough of the sea, and without sufficient "way on" to enable the rudder to act; under such circumstances it was suggested that there might be a bow rudder, and a propeller so placed as to assist the action of the helm in bringing the vessel round. The necessity for the formation of capacious docks and harbours expressly for such large vessels was pointed out, as until that was done they must load and discharge in the river or roadstead.

It was admitted, that the proposed record of construction would be of scientific value, but the advantage of making it a part of the ordinary register was questioned. The full consideration of the best form of fishing and life-boats which had been incidentally mentioned was strongly urged, on scientific grounds and in the interests of humanity. The questions of what were, scientifically, the limits of bulk of vessels, and power of engines, and commercially the most profitable dimensions for carrying cargoes and passengers, bearing in mind the period of inactivity, whilst loading in port, were shown to be the main points for useful consideration, as it was as much the province of the engineer to consider the commercial result, as the details of execution of any proposed construction, or plan of operations.

The innovations proposed by Mr. Roberts, and illustrated by his models, were examined. An examination was made of the project for transmitting letters between Holyhead and Dublin, at a speed of 22½ statute miles per hour;—of that for communicating between New York and Liverpool in six days, at an average speed of 22 nautical miles per hour;—and for steaming to Calcutta and back, without re-coaling, traversing a distance of about 25,000 nautical miles, at an average speed of 15 nautical miles per hour; using elaborate calculations and tabulated results, based on the duty performed by H.M.S. *Rattler*, with a given power, and under known conditions. Objections were raised to accepting 7½ knots per hour as the data for the present average rate of speed of ocean steamers; it was urged, that such an average must have been

derived from the voyages of steamers of old date, and without regard to the later results deduced from the performances of the Cunard and the Collins's lines of steamships. The propriety of taking the *Rattler* as a model steamer was questioned, especially as the data were not given for selecting that vessel, it being argued that the *Rattler* had not performed a series of long voyages, under every variable line of immersion, or under such changes of weather and states of the sea, as to furnish data for such important deductions.

The advantage of increasing the proportion of length to breadth was apparent, if it was admitted that the cargo-bearing capacity of a vessel was thus augmented without materially affecting her direct resistance through the water, supposing her midship section to remain unaltered. The proper proportion of length to breadth for an efficient ocean-steamer was, however, an intricate question. Taking the *Wave Queen* as an example, the length of that vessel had been stated to be thirteen times her beam; now such proportions might answer well for the river Thames, and a great speed might be attained; but such a vessel would, under certain circumstances, be unfit to navigate the British Channel. The same might be said of the American river-steamers, which were reported to have attained almost fabulous rates of velocity; but such proportions as theirs, if attempted in ocean-steamers, would only induce failure and loss of the vessels in heavy gales in the open ocean.

AERIAL SAFETY RAILWAYS ON THE BANKS OF THE THAMES.

To the Editor of the Mechanics' Magazine.

Sir,—To provide adequate facilities for the daily-increasing passenger traffic of the metropolis appears to be a great desideratum with the City authorities. By establishing tension or fixed railways, under the patent of Mr. H. James, C.E., on each side of the river, for passenger traffic, between London and Battersea-bridges, with stations at each of the bridges approached from the footway, much relief would be given to the river navigation, as well as to the great thoroughfares leading from the West-end to the Bank, and the railway termini at London-bridge. To combine the ornamental with the useful, these lines of rail might be supported on single iron fluted pillars, or arched walls, with elegant gas-lamps branching from either side. From the present crowded state of the river craft, it would be advisable to fix these pillars, if preferred, 100 feet apart, and protect them with wooden piles, firmly fastened together.

Single carriages might be employed to and fro between the stations of any two bridges, that would accommodate about forty first and second-class passengers. These carriages might be propelled by manual labour, at a speed of 50 miles per hour, with the greatest ease, between stations two miles apart.

The tension railway-carriages would move on rollers or drums about 3 feet in diameter, having 4-inch axles, on which would hang friction-wheels 3 feet in diameter, clipping the sides of the tension or fixed rails, so as to render it utterly impossible for the carriages to get off the line. Each revolution of the friction-wheels would propel the carriages a distance of 27 yards.

For the public accommodation, the trains should run from six in the morning until ten at night in summer, and from seven in the morning until nine in the evening in winter.

For the whole, or part of the distance between London and Westminster-bridges, the fares might be 2d. for the first, and 1d. for the second-class passengers. A similar rate might be charged between Westminster and Battersea-bridges.

The average passenger traffic between London and Westminster-bridges, when in full operation, may be fairly estimated at above 80,000 per day.

The constructing of tension or fixed lines of railway, with their appurtenances, would cast from £3,000 to £5,000 per mile, under ordinary circumstances. In the present case the cost would be much greater, which the traffic, nevertheless, would abundantly remunerate.

These noiseless tension or fixed railways on the sides of the Thames, with their majestic iron columns and branching lamps, would have a light, airy, and grand appearance; and, while greatly adorning our far-famed river, would constitute one of its most useful and valuable adjuncts.

In conclusion, it may be well to remark, that there are numerous situations throughout the country where short lines, on this system, might be most advantageously as well as profitably established. And further, should greater speed be required for passenger traffic, for long distances, than has hitherto been attained, by having the stations about 30 miles apart, and employing steam-power as the means of propulsion, a speed of 2 miles per minute and upwards might be easily attained and safely applied; so that a journey to or from London to Liverpool, including stoppages at the several stations to change carriages, might be accomplished in about two hours. The

engines and carriages would be very light; the latter should accommodate about thirty passengers.

I am, Sir, yours, &c.,

AERIAL.

PROPOSED METHOD OF PREVENTING BOILER EXPLOSIONS.

BY MR. ROBERT ROUGHTON, ENGINEER, R.N.

THE object of this invention, which is applicable to any description of boiler, is to prevent the internal steam pressure from exceeding any determined limit, whereby the fearful consequences of boiler explosions may be avoided.

It consists in the addition of a dome of any suitable form, the diameter and thickness of metal of which are such as will give it a strength very little exceeding that which is necessary to withstand the pressure at which the boiler is usually worked; but at the same time much less than the extreme strength of the boiler, so that the dome will burst and relieve the boiler whenever an undue pressure occurs. It is affixed on or connected to the boiler in such a position as will allow the steam or other fluid, or gas, or vapour, as the case may be, to escape in such a direction that it will not be liable to scald or otherwise injure persons who may happen to be near.

This invention is not intended to supersede the use of safety-valves, but to prevent the boilers from being burst whenever the safety-valve becomes inoperative by accident, or by the ignorance, neglect, or design of those who have the care of it.

To show how much the extreme strength of boilers exceeds that at which they are worked, we will compute the strength of an ordinary locomotive boiler of 50 inches diameter, and made of plates three-eighths of an inch thick. When this cylindrical boiler is burst, every inch in its length must have had a pressure equal to the strength of the plates whose area for this length is twice $1 \times \frac{3}{8} = \frac{3}{4}$ of a square inch, and strength, therefore, equal to 15 tons; but if we allow one-third for loss of strength by riveting, the force that would burst one inch of the length of this boiler would be 10 tons=22,400 lbs., and as the steam-pressure is distributed throughout a diameter of 50 inches,

$$\frac{22400}{50} = 448 \text{ lbs.}$$

pressure per square inch; the ordinary working pressure seldom exceeds 80 lbs.

Marine-engine boilers worked at a pressure of 16 lbs. per square inch, have their flat sides supported by stays 14 inches apart, and 1⅝ inches diameter; the pressure per square inch of steam that will burst them is therefore equal to,

$$\frac{\frac{13}{8}^2 \times \cdot 7854 \times 20 \times 2240}{14^2} = 474\cdot 8 \text{ lbs.}$$

per square inch.

LECTURES AT CLAPHAM AND ST. JOHN'S WOOD.

WE lately attended a Lecture delivered by Mr. Edmund Wheeler, C.E., at the Literary and Scientific Institution, Clapham, on "The Philosophy of Heat, its Sources and Applications." We were somewhat disappointed on finding the lecturer treat the theory of heat with extraordinary brevity, and pass over the earlier portions of his subject, such as the distinction between sensible and latent heat, and the methods of estimating temperature, with some degree of inexactness. Although a large amount of information was undoubtedly presented to the audience, and numerous experiments were very well conducted, yet we could not help considering the lecture as, upon the whole, very defective. Much that dissatisfied us, certainly was due to circumstances, which greater care on the part of the lecturer would have altogether avoided. For instance, in describing the action of a thermometer, he stated that the fluid in the tube descended by its *specific gravity*. Again, he said, "When you light a candle, you heat the hydrogen and carbon which refers to the tallow." The same may likewise be said of the following: "The boiling point is indicated by figure 212;" and again, "the mark of minus is always put opposite below zero," and other similar sentences.

On Thursday evening last, November 24, we were present at a lecture addressed by Mr. Greaves to the members and friends of the Literary and Scientific Institution, St. John's-wood, on "The Chemistry of Heat, and Phenomena of Combustion." This lecture was somewhat deficient in method; its several parts needed coherence, and the manner of the speaker, when reading, occasionally reminded one of the pulpit. It was, however, a very instructive, and, with the above exceptions, an excellent one; remarkable for conciseness and accuracy. The perfect ease with which the lecturer conducted his experiments, and the taste displayed in their selection, were particularly pleasing.

The various methods of developing heat were referred to, and the nature of chemical action and affinity explained, so far as was necessary for the elucidation of

the subject under notice. The process of combustion was described and illustrated in various ways. During the course of the lecture, the luminosity and various colours of flame, the principles on which furnaces are constructed, Davey's Safety-lamp, and many other such matters were adverted to. Altogether the lecture was a valuable and interesting one.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

JOHN CLAPHAM, THOMAS CLAPHAM, and WILLIAM CLAPHAM, of Wellington Foundry, Keighley, York. *Improvements in moulding and casting iron pipes.* Patent dated May 10, 1853. (No. 1143.)

This invention relates, *firstly*, to a mode of moulding iron pipes in loam or green sand, and consists in a peculiar arrangement of the flask or box to be employed for that purpose, and in a certain tool constructed so as to strike up the loam in the said flask or box: and, *secondly*, to the casting of pipes in such said flask or box.

THOMAS MURRAY, of Maygold, Berwick, Scotland, farmer. *Certain improvements in breaks or drags for wheeled carriages, and in adapting the carriages for the application and use of such breaks.* Patent dated May 10, 1853. (No. 1144.)

Claim.—The adaptation and application to wheeled carriages of breaks or drags fixed in front of the wheels, and which may be brought into action upon the wheels by putting back the body of the carriage.

GREGORY KANE, of Dublin, camp furniture manufacturer. *The construction of portable houses, or portions thereof, out of parts which may be used for other purposes.* Patent dated May, 10, 1853. (No. 1145.)

Claims.—1. The formation and construction of packing-cases in such manner as to admit of their being afterwards converted into the main parts of portable houses.

2. The construction of such houses out of such parts raised upon a foundation frame, and combined with other suitable parts, so as to make them habitable and commodious.

OCTAVIUS HENRY SMITH, of Bedford-square, and YOUNGS PARFREY, of Pimlico, both of Middlesex. *Improvements in the manufacture of carriage-wheels.* Patent dated May 10, 1853. (No. 1146.)

This invention consists of casting parts of the naves of carriage-wheels of metal in such manner that each nave has sockets or openings to receive the spokes, and the centre of the cast part is hollow to receive wood or soft material. The box for the axletree is fixed in the soft material, and the ends of the spokes rest upon the soft material so introduced into the nave.

Claim.—The construction of naves of wheels, herein described.

GEORGE TILLETT, of Kentish Town, Middlesex. *Improvements in the manufacture of metal bedsteads.* Patent dated May 10, 1853. (No. 1148.)

This invention consists of several improvements in the construction of metal bedsteads.

The pillars are made of tubes, which have slots formed therein for receiving the ends of the rails; the slots are made in sheet metal, and the sheets are then formed into tubes, and in some cases the head and foot-rails are fixed to the tubular pillars by being bent partly or wholly round them, and then soldered or otherwise fastened thereto.

The laths are fixed into the rails by having notches formed in the upper surface of the rails, the larger parts of the notches being outward, and the end of the laths are made to correspond on the upper surfaces of the rails; narrow fillets of hoop-iron are placed over the laths, which give the appearance of angle-iron to the rails, and they serve as valance-rods or stretcher-rails; or laths are used turned down at their ends, which enter between the rails.

GEORGE ROBERTON and ALEXANDER ROBERTON, both stuff-finishers, of Bradford, York. *Improvements in apparatus for drying and finishing woven fabrics.* Patent dated May 10, 1853. (No. 1149.)

These improvements consist in passing the fabric, when "rigged," partly around each of a series of cylinders, by which a finishing effect is obtained, such as that produced by the paper boards under the old process, but more efficiently.

The cylinders may be heated by steam passing through their hollow axes, as is well understood; and if the fabric to be treated is wet from dyeing, the drying thereof is at the same time effected by heat applied to any or all of the series of cylinders.

In connection with apparatus arranged for working as above explained, the inventors apply a steam pipe, perforated, to emit jets of steam against the fabric as it passes out of the apparatus.

Claim.—Drying and finishing fabrics, of the character referred to, by subjecting them, when "rigged" or folded, to the action of apparatus, such as explained.

WILLIAM JOHNSON, of Lincoln's-inn-fields, Middlesex, civil engineer. *Improvements in machinery or apparatus for sewing.* (A communication.) Patent dated May 10, 1853. (No. 1150.)

1. The general arrangements and construction of mechanism, as described.

2. The combination in sewing-machinery of a single-hooked needle with two thread-guides or carriers, each carrying a separate thread, and actuated in such manner that during one passage of the needle through and out of the cloth or material to be sewn, one of the said guides shall lay its thread in the hook of the needle, whilst during the next passage of the needle through and out of the cloth the other guide shall lay its thread in the hook of the needle, each guide acting alternately.

3. The mode of arranging machines with one needle and two thread-guides, to produce the chain-stitch with one thread passed through one of the two eyes of its two thread-guides, with a slot for the reception of the thread.

4. The mode of sewing cloth or other material wherein the two combined threads are drawn through from the same side of the sewn material and through each other's loops.

5. The application and use in sewing-machines of the closing side of the hooked needle to the same side as the barb or hook, so that it may slide in a groove in the needle or carrier parallel to the needle's motion.

John Henry Johnson, of Lincoln's-inn-fields, Middlesex. *Improvements in machinery or apparatus for effecting agricultural operations* (A communication.) Patent dated May 10, 1853. (No. 1151.)

Claims.—1. The general arrangement and construction of machinery, apparatus, or means for accomplishing agricultural operations, as described.

2. The system or mode of digging or disintegrating the soil, and of reaping, mowing, and performing other agricultural operations, by means of mechanism actuated directly by steam-power, but traversed or conveyed over the land by horse, or other separate power, the same being applicable for the cutting of drains.

3. The application and use in digging or pulverizing operations of a digging or soil-loosening cylinder, which is driven at a high velocity by steam-power.

4. The application and use of spring-hinged arms for receiving the cut grain, or other crop, as described.

5. The application and use of a hollow or tubular driving or first-motion shaft, arranged to work loose upon the axle of the supporting running-wheels, as described.

6. A system or mode of driving the main running-wheels, whereby the machine is rendered self-locomotive.

7. The simplified arrangement and use of the steam cylinder and valve, and gearing, as described.

8. The application and use of the levelling-box, or grating and roller, in conjunction with a seed-box or manure-distributor.

9. The mode of sowing or distributing seeds and manure by apparatus driven by the travelling motion of the machine.

10. The mode of effecting agricultural operations by the use of a machine, in which the horses or actuating medium go before the pulverizing apparatus in digging, preparing, and sowing, and behind it in reaping and mowing.

11. The mode of arranging the platform-wheels, either in the same plane or in a different plane, with the large running-wheels.

12. The mode of supporting the digging-cylinder or rotary arms by means of a frame carried on fixed centres in the body of the cart, and capable of adjustment vertically.

13. The mode of facilitating the turning of the machine at the head-lands, by elevating the hind or trailing-wheels, and thus throwing the whole weight of the implement upon one pair of wheels.

Alexander Chaplin, of Glasgow, Lanark, North Britain, engineer. *Improvements in apparatus for the transmission of aëriform bodies.* Patent dated May 10, 1853. (No. 1152.)

Claims.—1. The general arrangement and construction of machinery, apparatus, or means for blowing, exhausting, or transmitting aëriform bodies, as described.

2. "The system or mode of constructing fans wherein two or more fans are carried upon one and the same spindle, each fan in its separate distinct case, and the two being made to work with combined effect."

3. The system or mode of actuating duplex or multi fan-blowers by means of a central or intermediate pulley, so as to drive from the centre of the apparatus.

4. The system or mode of constructing blowing or exhausting apparatus wherein either a combined blowing effect may be obtained, or a simultaneous exhausting and blowing action, or a combined or duplex exhaust at pleasure.

George Stevenson Buchanan, of Glasgow, Lanark, North Britain, finisher. *Improvements in the treatment or finishing of textile fabrics.* Patent dated May 10, 1853. (No. 1153.)

1. The general arrangement and construction of machinery, apparatus, or means for finishing textile fabrics, as herein before described.

2. The system or mode of finishing textile fabrics by means of vibrating angling guide-rails articulated together, or working in concert, as hereinbefore described.

3. The system or mode of finishing textile fabrics by means of articulated guides giving a continuous angular breaking tra-

verse to the carrying-chains or belts of the fabric.

4. The system or mode of finishing textile fabrics by traversing the carrying-chains or belts of such fabrics through or over independent vibrating guides.

5. The system or mode of finishing textile fabrics wherein the transverse angling motion is independent of the forward carrying movement.

6. The system or mode of finishing textile fabrics by means of a differential angling vibrating action, that is, with one portion of the angling guides straight whilst the other is angled.

7. The system or mode of constructing finishing machines with divided guides at the longitudinal centre, to allow of the differential angling action of the belts.

SAMUEL RUSSELL, of Sheffield, York, manufacturer. *Improvements in handles for razors.* Patent dated May 11, 1853. (No. 1154.)

Claim.—The use and application of white or Britannia metal for and in the manufacture of razor-handles.

JACOB BRETT, of Hanover-square, Middlesex, gentleman. *Improvements in electric telegraph apparatus.* (Partly a communication.) Patent dated May 11, 1853. (No. 1155.)

Claims.—1. The application of compressed air or of chemical gases to the purpose described.

2. The application of friction-wheels with bands for giving motion to the telegraphic apparatus.

3. An arrangement of compound magnets, as described, in connection with a collar-valve and cylinder.

4. The application of a double-headed piston in a cylinder, and in connection with an escapement-lever.

5. An arrangement of the tension-spring for giving the recoil to magnet armatures.

6. The use of an air-cylinder and piston for ringing alarum-bells, and for giving railway-signals.

MARIE PIERRE FERDINAND MAZIER (doctor), of Aigle, France. *A machine for cutting and reaping corn, corn-crops, and other plants.* Patent dated May 11, 1853. (No. 1156.)

Claims.—1. The employment of a following-carriage for carrying the cutter and apparatus connected therewith, as described.

2. The method of giving motion to the cutter from the axle by means of a screw and wheel.

3. The employment of a roller in connection with the machine for laying the crop in the right direction to be cut.

4. So arranging reaping-machines that the cutters may be placed on either side of the machine, so as to enable the machine to reap whilst travelling in either direction.

SAMUEL CUNLIFFE LISTER, of Manningham, York, machine wool-comber. *Improvements in treating and preparing, before being spun, wool, cotton, and other fibrous materials.* Patent dated May 11, 1853. (No. 1157.)

This invention consists in having two combs travelling in parallel lines, and having a working-comb placed between them, and so arranged that the fibrous material taken from one comb whilst being worked by the working-comb shall be placed upon the other travelling-combs to be drawn off. The inventor states that he also finds it beneficial to apply backing and milking-rollers to cotton combing-machines.

HENRY POTTER BURT, of Charlotte-row, London, civil engineer. *Improvements in portable houses.* Patent dated May 11, 1853. (No. 1159.)

Claims.—1. The construction of portable houses with uprights composed of flat pieces of wood placed between two angle-irons, as described.

2. The construction of portable houses with rafters and joists composed of tapering pieces of wood placed between two flat bars of iron, and secured by hoops, as described.

RICHARD EDMONSON, of Blackburn, Lancaster, manufacturer. *Certain improvements in the manufacture of covered corded textile fabrics, and in machinery to be used for that purpose, being applicable either to hand or power.* Patent dated May 11, 1853. (No. 1160.)

Claims.—1. The covering of cords in the warp of a fabric by a woven texture above or below, or both above and below the cords, as described.

2. The use of a reed or reeds behind the common reed, to keep the cords or strands from cockeling.

3. An improved tie-up of the heald-shafts, and the working of them in sectional parts, so as to produce parallel sheds.

4. The weighting of the slay to prevent vibration, as described.

5. The use of covered rollers, for the purpose of taking up the fabric as it is woven.

WILLIAM BRADBURY and FREDERICK MULLETT EVANS, of Whitefriars. *Improvements in taking impressions and producing printing surfaces.* Patent dated May 11, 1853. (No. 1164.)

Claim.—The employment of lead for obtaining impressions and for receiving electro depositions of copper.

EDMUND WHITAKER, of Rochdale, engineer, and JAMES WALMESLEY, the younger, of Smithy Bridge, near Rochdale, earthen-

ware manufacturer. *Improvements in the manufacture of pipes, tiles, bricks, and slabs, from clay.* Patent dated May 11, 1853. (No. 1167.)

This invention consists in the application of the direct action of the elastic force of air, for the purpose of pressing clay into or through dies or moulds, in the manufacture of pipes, tiles, bricks, and slabs. The inventors describe two of many machines which may be constructed for the above purpose.

George Bell, of Powell-street, Goswell-street, Middlesex, gentleman. *Improvements in obtaining liquid cement, and pigments, or paints.* Patent dated May 11. 1853. (No. 1169.)

This invention relates to combinations of lime, sulphate of iron, or zinc, and sal-ammoniac, for the production of the articles mentioned in the title.

George Frederick Goble, of Fish-street-hill, London, master mariner. *Improvements in propelling vessels and carriages, parts of the machinery therein employed being applicable to other like purposes.* Patent dated May 12, 1853. (No. 1172.)

Claims.—1. A novel arrangement of an endless-chain or chains, carrying float-boards or drags for propelling vessels.

2. The same arrangement, modified for propelling carriages.

3. A serrated apparatus to be used for connecting and binding, as described.

Joseph Denton, of Prestwich, Lancaster, gentleman. *Improvements in machinery or apparatus for manufacturing looped terry, or other similar fabrics.* Patent dated May 12, 1853. (No. 1175.)

This invention consists in an improved mode of arranging the parts of a loom (in which the terries or loops are made without the aid of wires or other such contrivances), so that a weft-thread shall be introduced into the open shed below the terry-warp threads immediately before every descent of the bar upon or towards the table.

Charles Pooley, of Manchester, Lancaster, cotton-spinner. *An improved mode of feeding machines for opening, cleaning, blowing, and scutching cotton and other fibrous substances.* Patent dated May 13, 1853. (No. 1178.)

This invention consists in dispensing with the usual feeding apparatus used in machines for opening, cleaning, blowing, and scutching cotton and other fibrous substances, and in making the current of air created by the partial vacuum formed while the said machines are at work, draw the cotton or other fibrous substances through a covered trough into the machine to be there operated upon, in the usual manner. The inventor claims the above arrangement.

George Bertram, of the firm of William and George Bertram, engineers, Edinburgh, Scotland. *Improvements in the manufacture of paper.* Patent dated May 13, 1853. (No. 1181.)

This invention consists, in the first place, in the employment of an engine or trough, of such form as to admit of rollers working within it in such manner as to pass the materials under operation from one roller to the other, without their having to travel round the partition known by the name of "midfeather;" and the invention consists, in the second place, in adjusting the plates on which the rags or other material are reduced to pulp underneath the rollers to their required position in relation thereto, instead of adjusting the rollers to the plates.

Claims.—1. The formation of the engine or trough, of whatever material composed, with the whole of the internal space open, except that which is occupied by the rollers, so as to admit of an uninterrupted passage of the material under operation from roller to roller, as described.

2. The adjustment of the plate to the roller, as described.

George Stiff, of Minerva Cottage, Christchurch-road, Brixton-hill, Surrey, gentleman. *An improved construction of printing-machine.* Patent dated May 13, 1853. (No. 1182.)

Claim.—The employment of a reciprocating segment-table for traversing the type under the pressing-cylinder.

William Thomas, of Cheapside, London, merchant. *Improvements in weaving narrow fabrics for binding.* Patent dated May 13, 1853. (No. 1183.)

This invention consists in applying a stitching-warp near one or both of the selvages, in weaving a narrow fabric suitable for binding, in order to produce a row or rows of stitching near one or both edges or selvages, and thus to produce a better and more uniform finish to articles bound thereby.

Charles Tetley, of Skinner-street, London. *Improvements in rotatory engines* Patent dated May 13, 1853. (No. 1184.)

This invention consists of an arrangement of machinery in which a cylinder is fixed on a hollow axis, and has on its periphery a projecting thread or screw. This cylinder fits into a hollow cylinder or drum, and revolves therein. Through one part of the outer fixed-cylinder there is a curved opening in which part of a circular ring slides and constantly closes the opening and renders it fluid-tight. This ring is caused to move through the opening, by means of the projecting-thread or screw on the rotating cylinder, one end of the screw entering a notch in the

ring as the other end of the thread or screw leaves another notch; hence, the portion of the ring, which for the time being is within the cylinder and across the hollow chamber thereof, forms a stop or abutment for the fluid to press against, and consequently the opposite pressure of the fluid will press against the thread or screw, and move the inner cylinder round, when it is to be worked by the fluid, but the reverse action takes place when the engine is caused to be moved by power, with a view to move or propel fluids. The fluid passes into and out of the engine through the axis.

The inventor claims the combination of parts above described.

George Fitzjames Russell, of Duke-street, Adelphi, Middlesex, gentleman. *An apparatus for disengaging, lowering, and raising ships boats.* Patent dated May 14, 1853. (No. 1190.)

Mr. Russell proposes to use davits, constructed so that the part to which the boat is suspended is capable of turning about a centre. The boat is to be raised by means of chains which pass over the davit pulleys and lead down to a barrel, upon which they are to be wound or otherwise. The barrel is placed athwartships in the topside, the inner part being flush with the inner surface of the bulwark. The barrel is placed at or near the foot of one davit, and the chain fall from the other davit is lead to the barrel over sheaves placed fore and aft in the middle of the timber heads.

The inventor also describes several methods of connecting the tackle-blocks to the boats, so as to allow the boat to be let go at each end simultaneously. This he effects by means of a bolt which is fitted along the inside of the bottom of the boat, and made to release the tackle-blocks at either end of the boat simultaneously by acting upon levers connected with plates or eyes attached to those blocks. The inventor claims the above arrangements. (We may add, that the first part of this invention very much resembles a plan suggested many months since by a correspondent of the Journal of the Society of Arts in the pages of that Journal.)

George Coppock, of Heaton Norris, Lancaster, manager to Messrs. Williamson and Roberts, of the same place, machine-makers. *Certain improvements in looms for weaving.* Patent dated May 14, 1853. (No. 1191.)

Claim.—Improved combinations of parts for actuating the picking-sticks of looms without the aid of picking-straps, as described: also, making the tapping-shaft revolve in the same direction as the crank shaft.

James Higgin, of Manchester, Lancaster, manufacturing chemist. *Improvements in printing or dyeing woven or textile fabrics, and in the manufacturing of certain substances to be used in the arts or processes of dyeing and printing.* Patent dated May 14, 1853. (No. 1193.)

Claim.—The use of a silicate of an alkaline earth diffused in water in place of cow-dung in the dunging operation, as described.

Thomas Stephen Holt, of Manchester, Lancaster, engineer. *Improvements in steam engines, which improvements are also applicable to the machinery or apparatus connected to steam boilers.* Patent dated May 14, 1853. (No. 1194.)

This invention relates,—*First*, to improvements in machinery or apparatus for regulating the speed or motion of steam engines working either with or without expansion, and which are applicable to governors or similar apparatus for regulating motive power. *Second*, to an improved eccentric for giving more or less lead and throw by means of an eccentric bush, which can be altered when in or out of motion for the purpose of working valves, pumps, or similar apparatus, either expansively or otherwise. *Third*, to an improved valve with a hollow spindle for regulating the friction on the face by means of a centre spindle. This part of the invention is applicable to every description of disc valves, whether used for the purposes of steam-water or gases. *Fourth*, to a mercury-gauge with an improved overflow pipe, or receiver, so that if the steam should be raised above the indicated pressure, it will prevent the mercury being wasted. And, *Fifth*, to an improved method of expanding the packing or packings of pistons for cylinders or pumps, of any or every description, by means of two inclined links without wedges.

Moses Poole, of Avenue-road, Regent's-park, Middlesex, gentleman. *A new or improved machine for pegging boots or shoes.* (A communication.) Patent dated May 14, 1853. (No. 1195.)

The inventor describes:

1. Machinery for supporting the shoe, and moving it under the pegging mechanism.

2. Machinery for sustaining the pegging mechanism, and regulating the direction of the pegging-awl, so that it shall pass into the sole at the proper angle under every change in the curvature of the sole.

3. Machinery for operating the pegging-awl and driver.

4. Machinery for sustaining the peg-wood, and forcing it forwards towards the shoe.

5. Machinery for operating the charger that contains the peg-wood.

Herman Dirs Mertens, of Margate, Kent, solicitor. *Improvements in preparing*

materials to be employed in making beer and other beverages. (A communication.) Patent dated May 14, 1853. (No. 1196.)

The material mentioned in the title is prepared by taking any kind of worts, in a good condition, as made or produced by brewers, distillers, and others, and evaporating the water from it by any convenient process applicable to the purpose (though the use of a vacuum-pan heated by steam is recommended), till the residuum is reduced to a thick syrup. This thick syrup is then poured into heated pans, for accelerating and completing the evaporation, which should be further assisted by agitation, by mechanical means, in the usual manner; and as the continued evaporation renders the liquid still thicker or more viscid, it is kneaded by hand or by machinery, portions of it being constantly drawn off into the air, till the slighter or tape-like portions or stripes of it become brittle, and will break like glass. This operation is continued till the mass is so far solidified that it does not adhere to the skin on touching it when the process is completed, and the substance is moulded or packed in any required form, in strong casks or other receptacles most convenient for stowage or transmission, so as to protect it from humidity, or from the action of the atmosphere; and thus preserved, it will keep good for many years in any climate.

PROVISIONAL PROTECTIONS.

Dated September 5, 1853.

2042. John Clare, junior, of Liverpool, Lancaster, produce-broker. Improvements in the construction of iron houses, vessels, masts, spars, smoke-funnels, boilers, cylinders, beams, and other like structures or articles.

Dated October 22, 1853.

2443. Jean François Mermet, of Red-lion-street, Holborn. An elastic spring contained in a cylindric tube or tubular case, the lid of which moves down and up according to the pression.

Dated November 1, 1853.

2521. John Crowley, of Sheffield, York, iron-founder. Improvements in the construction of ovens and furnaces.

2523. James Hansor, of Wandsworth-road, Surrey, chemist. Improvements in the manufacture of illuminating-gas.

2525. Arthur Elliott, of West Houghton, Lancaster, mechanic. Improvements in looms for weaving.

2527. Henry Tylor, of the firm of Tylor and Pace, of Queen-street, London, manufacturers. An improved chair-bedstead.

2529. William Russell Palmer, of New York, United States of America. Improvements in the construction of spike threshing-machines, whereby all liability to and danger of accident in their use is removed and prevented.

2531. James Heywood, of Ratcliffe-bridge, Lancaster, dyer. Certain improvements in machinery or apparatus for printing yarns.

2533. Robert Archbutt, of King's-road, Chelsea, Middlesex, engineer. Improvements in wood-cutting machinery.

Dated November 2, 1853.

2535. Frederick Albert Gatty, of Accrington Lancaster, manufacturing chemist. An improved bath for heating and distilling.

2537. William Armand Gilbee, of South-street, Finsbury, London, and Rue de l'Echiquier, Paris, gentleman. An improved apparatus for levelling. A communication.

2539. William Maltby, of Camberwell, Surrey. An improved system or arrangement for preventing collisions or accidents on railways.

2541. Frederick Lipscombe, of the Strand, Middlesex, water-filter manufacturer. Improvements in obtaining steam power, and in regulating the same.

2543. Henry Brierly, of Chorley, Lancaster, manufacturer. Improvements in machinery or apparatus for spinning and doubling cotton and other fibrous substances.

2545. Richard Edward Hodges, of Southampton-row, Russell-square, Middlesex. An improvement in fastening the ends of springs made of India-rubber.

Dated November 3, 1853.

2547. Peter McGregor, of Manchester, machine-maker. Improvements in machinery for spinning and doubling.

2548. William Wood, of Chancery-lane, London, civil engineer. Abstracting and condensing smoke arising from steam engines and other furnaces, and obtaining a supply of air for supporting the combustion of the fuel in such furnaces, thereby superseding the necessity of chimney-shafts and funnels.

2549. John Moffat, of Birmingham, Warwick, manufacturer. An improvement or improvements in candlesticks. Partly a communication.

2550. Charles Reeves, junior, of Birmingham, Warwick, manufacturer. An improvement or improvements in the manufacture of swords, bayonets, and sword-bayonets.

2551. Thomas Irving, of Dalton, Kirkheaton, York. Improvements in preparing wool for spinning.

2552 Bryan Edward Duppa, of Malmaynes Hall, Kent, gentleman. Improvements in colouring photographic pictures.

2553. William Patterson, of Edinburgh, Scotland, cabinet-maker. Improvements in chairs.

2555. George Duncan and John Boyd, both of Liverpool, Lancaster, patent cask-manufacturers, and John Barker, of Knotty Ash, near Liverpool, doctor of medicine. Improvements in casks, and in machinery or apparatus for the manufacture of casks.

2556. Ebenezer Goddard, of Ipswich, Suffolk, gas-engineer. Improvements in gas-burners.

2557. Joseph Henry Tuck, of Pall-mall, Middlesex, engineer. Improved machinery for obtaining and applying motive power, and for raising and forcing fluids.

Dated November 4, 1853.

2559. George Nasmyth, of Brabant-court, Philpot-lane, London. Improvements in the construction of steam-boiler and other furnaces.

2560. William Hindman, of Manchester, Lancaster. Improvements in the construction of steam boilers, and in the mode or method of fixing the same.

2561. William Gilbert Ginty, of Manchester, Lancaster, civil engineer. Improvements in the mode of manufacturing the combustible gases resulting from the decomposition of water or steam, and in the construction of apparatus connected therewith.

2562. William Crosland, of Hulme, Lancaster, engineer. Improvements in apparatus for govern-

ing the speed of steam and other motive-power engines.

2563. William Rackster, of the Royal Military Academy, Woolwich, Kent, mathematical master. Improvements in the construction and arrangement of the buffing-apparatus of railway carriages, and in the mode of applying the buffer and draw-springs to such carriages.

2564. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery for crushing ores, and separating therefrom gold, silver, or other metals contained therein. A communication.

2565. John Hartley Higginbottom, clerk of works to the Local Board of Health, Ashby de la Zouch, Leicester. Improvements in water-closets, and in the apparatus connected therewith.

2566. Henry Pratt, of Boughton-street, Worcester. Improvements in kneading dough, and which said improvements are also applicable to the kneading or beating of clay, loam, or other plastic materials.

2567. William Foster, of Lister-place, Bradford, York, manufacturer. Improvements in looms for weaving.

2568. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, and of Glasgow, North Britain, gentleman. Improvements in the manufacture of malleable iron, which improvements are also applicable to the manufacture of other malleable metals. A communication from Clement Desormes, of Lyons, France, mechanical engineer.

Dated November 5, 1853.

2569. John Smith, machine-maker, of the Albion Works, Bradford, Yorkshire. Improvements in millstones for grinding corn, seeds, or minerals.

2571. Samuel Harrison, of Crewe, Chester, engineer. Improvements in and applicable to steam engines.

2572. John Hyde, of Sheffield, York. Improvements in furniture castors.

2573. Charles Carr, of Seghill, Northumberland, mining engineer, and William Kyle Horsley, of the same place, engineer. Improvements in steam machinery and pumps for lifting water from mines and other places.

2574. Robert William Jearrad, of Upper Eccleston-place, Eccleston-square. Improvements in steam-boiler and other furnaces.

2575. John Rubery, of Birmingham, Warwick, Improvements in the manufacture of open caps for sticks of umbrellas and parasols.

2577. William Beckett Johnson, of Manchester, Lancaster, manager for Messrs. Ormerod and Son, engineers and ironfounders. Improvements in steam engines, and in apparatus for indicating the pressure of steam.

2578. Edwin Kesterton, of Long Acre, Middlesex, carriage-builder. Improvements in springs for carriages.

Dated November 7, 1853.

2579. Henry Pershouse, of Birmingham, Warwick, manufacturer, and Timothy Morris, of Birmingham, manufacturer. An improvement or improvements in the deposition of metals and metallic alloys.

2580. John Todd, of Fish-street-hill, London, engineer. Improvements in the spindles and bearings of lathes and drilling-machines, and in other spindles and bearings.

2581. Marino Louis Joseph Christophe Vincent Falconi, of Paris, France, and of South-street, Finsbury, London, gentleman. A certain composition for the preservation of the dead.

2583. Jonathan Grindrod, of Liverpool, Lancaster, consulting engineer, and Alexander Hunter, of the same place, engineer. Improvements in steam engines.

2584. Henry Wiglesworth, of Newbury, Berks, bachelor of medicine. Improvements in connecting together or coupling railway carriages.

2585. Robert Roughton, of Woolwich, Kent, engineer in the Royal Navy. An improvement in steam boilers, which is applicable to other vessels for containing compressed air, vapour, or gas.

2586. Thomas Walker, of Birmingham, Warwick, engineer. Improvements in signal-apparatus for the prevention of accidents on railways.

2587. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. Certain improved means for preventing the fraudulent abstraction of property. A communication.

Dated November 8, 1853.

2588. John Onions and Samuel Bromhead, of Marlborough Estate, Peckham, engineers. Certain improvements in machinery used in the manufacture of paper and papier-maché.

2589. John Gardiner, of Great Marlow, Buckingham, ironmonger, and William Watkin Wynne, of the same place, brewer. An improved construction of gas-stove.

2590. Edmund Hugh Graham, of Maine, United States of America. New and useful improvements in fire-arms.

2591. Humphrey Chamberlain, of Kempsey, near Worcester. Improvements in the manufacture of bricks and tubes or tiles.

2592. George Frederick Parratt, of Victoria-street, Pimlico. Improvements in life-rafts.

2593. Edward Lambert Hayward, of Blackfriars-road. Improvements in the roses of door and other locks.

2594. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, and of Glasgow, North Britain, gentleman. Improvements in machinery for combing and preparing wool and other fibrous materials. A communication from Henri Jules Alphonse Paris, of Paris, France, machinist.

Dated November 9, 1853.

2596. Benjamin Dangerfield, of West Bromwich, Stafford, engineer, and Benjamin Dangerfield, junior, of West Bromwich, engineer. Improvements in the construction of steam boilers.

2597. Thomas Dunn, of the Windsor-bridge Iron-works, Pendleton, Lancaster, engineer; James Bowman, of Plaistow, Essex, engineer; and Joseph Dunn, of Bellevue-terrace, Pendleton, millwright. Improvements in machinery for raising, moving, and lowering heavy bodies.

2598. Jerome André Drieu, of Patricroft, Lancaster, machinist. Improvements in machinery for cutting velveteens and certain other fabrics to produce a piled surface.

2599. John Brown Darlington, of Durham, mining engineer. Improvements in coke-ovens.

2600. William Dicks, of Floore, Northampton, smith. Improvements in wheels for carriages.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," November 18th*, 1853.)

1449. Charles Wye Williams. Improvements in the manufacture of sheet iron, and of iron plates used for boilers, vessels, buildings, and other like purposes.

1494. John Cross Richardson. Certain improvements in machinery or apparatus for winding yarn.

1495. John Cross Richardson. Certain improvements in looms for weaving.

(*From the "London Gazette," November 22nd*, 1853.)

1484. Henry Saunders. Improvements in drying grass and other crops.

1505. John William Perkins. Improvements in the manufacture of artificial manure.

1510. Robert Galloway. Improvements in manufacturing and refining sugar.

1546. Leon Valls. Improvements in the production of printing surfaces. A communication.

1547. Daniel Illingworth, Alfred Illingworth, and Henry Illingworth. Improvements in machinery or apparatus for combing wool, cotton, flax, silk, and other fibrous substances.

1581. William Charles Spooner. Improvements in drills for agricultural purposes.

1582. William Tasker. Improvements in drills for agricultural purposes.

1598. Henry Meyer. Certain improvements in looms for weaving.

1600. Decimus Julius Tripe. Improvements in locks.

1609. Peter Armand Lecomte de Fontainemoreau. Improvements in typographical printing-presses. A communication.

1616. John Woodward. An apparatus for curling hair.

1717. Edwin Dalton Smith. Improvements in crushing and washing ores and earths.

1793. John Shae Perring. Improvements in the permanent way of railways.

1825. Thomas Moss. Improvements in printing bank-notes, cheques, bills of exchange, and other documents requiring like security against being copied.

1861. Alexander Prince. A press applicable to the several purposes of lithography, autography, typography, chromolithography, or printing in colours, copper-plate printing, cylinder-printing, embossing, and copying letters. A communication.

1889. Thomas Allan. Improvements in electric conductors, and in the means of insulating electric conductors.

1941. Alfred Lutwyche. An improved mode of manufacturing steel or other metallic pens.

2065. Robert Harrington. Improvements in umbrellas and parasols.

2086. Alfred Vincent Newton. Improved manufacture of gas-burner and gas-regulator. A communication.

2175. Samuel Walker, junior. New or improved machinery for manufacturing thimbles.

2236. James Willis. Improvements in gig-harness.

2259. Alfred Stanistreet Jee. Improvements in the construction of rails for railways.

2268. Daniel Towers Shears. Improvements in brewing.

2297. John Onions and Samuel Bromhead. Certain improvements in steam-engine boilers.

2306. Henry Dubs. Certain improvements in the manufacture of wheels and tires, and also in the construction of furnaces employed in such or similar manufactures.

2320. Richard Archibald Brooman. Improvements in railway switches. A communication.

2337. Bernard Cowvan. Improvements in giving signals on railways.

2351. Richard Jones and Charles John Jones. Improvements in fire-arms.

2358. John Thomas Way. Improvements in making and refining sugar, and in treating saccharine fluids.

2388. George Frederick Chantrell. Improved apparatus applicable to the manufacturing and the revivification of animal or vegetable charcoal and other useful purposes.

2418. Alexis Dussuc. An improved machine for digging and cultivating land.

2433. James Warburton. Improvements in preparing rape-seed oil. A communication.

2442. John Baily. The cure of the roup and other diseases in fowls and poultry.

2446. Hume Greenfield. Improvements in obtaining power by carbonic acid gas. A communication.

2455. Thomas Summerfield. Improvements in the construction and manufacture of windows.

2460. Alfred Curtis and Bryan Donkin the younger. Improvements in machinery for cutting rags, rope, fibrous, and other substances.

2466. Charles Goodyear. Improvements in the manufacture of boots and shoes.

2475. Downes Edwards. Improvements in signal-apparatus for railways.

2476. Patrick Benignus O'Neill. Improvements in screw-wrenches. A communication.

2487. William Vaughan, John Scattergood, and Charles Grimshaw. Certain improvements in healds or harness for weaving, and in the method of and machinery or apparatus for fabricating the same.

2496. Aristide Michel Servan. Improvements in treating phormium tenax, flax, and other vegetable fibrous matters.

2497. John Johnson. Improvements in looms for weaving terry and other similar fabrics.

2503. Richard Archibald Brooman. Improvements in machinery for dressing flax, hemp, and other like fibrous substances. A communication.

2505. Andrew Maclure. Improvemennts in lithographic printing-presses.

2513. John Gray. A self-acting flushing-apparatus applicable to sanitary purposes.

2526. John Whitehead and Thomas Whitehead. Certain improvements in cutting-tools, and in the working of iron, brass, and other metals, and wood and other materials.

2530. Joseph Bauer. Cultivating and digging the soil by means of a steam-digging and harrowing-machine.

2544. James Howard. Improvements in horse-rakes and harrows.

2545. Richard Edward Hodges. An improvement in fastening the ends of springs made of India-rubber.

2546. Charles Iles. Improvements in metal bedsteads.

2551. Thomas Irving. Improvements in preparing wool for spinning.

2552. Bryan Edward Duppa. Improvements in colouring photographic pictures.

2555. George Duncan, John Boyd, and John Barker. Improvements in casks, and in machinery or apparatus for the manufacture of casks.

2556. Ebenezer Goddard. Improvements in gas-burners.

2560. William Hindman. Improvements in the construction of steam boilers, and in the mode or method of fixing the same.

2561. William Gilbert Ginty. Improvements in the mode of manufacturing the combustible gases resulting from the decomposition of water or steam, and in the construction of apparatus connected therewith.

2575. John Rubery. Improvements in the manufacture of open caps for sticks of umbrellas and parasols.

2579. Henry Pershouse and Timothy Morris. An improvement or improvements in the deposition of metals and metallic alloys.

2586. Thomas Walker. Improvements in signal-apparatus for the prevention of accidents on railways.

2587. Alfred Vincent Newton. Certain improved means for preventing the fraudulent abstraction of property. A communication.

2594. John Henry Johnson. Improvements in machinery for combing and preparing wool and other fibrous materials. A communication from Henri Jules Alphonse Paris, of Paris, France, machinist.

2597. Thomas Dunn, James Bowman, and Joseph Dunn. Improvements in machinery for raising, moving, and lowering heavy bodies.

WEEKLY LIST OF PATENTS.

Sealed November 17, 1853.

1215. John Lee Stevens.
1217. James Thomas George Vizettelly and Henry Richard Vizettelly.

Sealed November 18, 1853.

1222. John Haskett.
1224. Wharton Rye.
1227. John Ryan.
1231. George Sant.
1327. John Macdonald.
1601. John Fall.
1864. David Mushett and Edwin White.
2064. James Gascoigne Lynde, junior.
2124. Richard Laming.
2150. John Barsham.
2186. George Peabody.

Sealed November 19, 1853.

1239. William Edward Newton.
1244. William Fulton.
1246. St. Thomas Baker.
1251. Auguste Edouard Loradoux Bellford.
1252. Thomas Isaac Dimsdale.
1254. William Carr Thornton.

Sealed November 21, 1853.

1260. Henri Joseph Scoutetten.
1262. Auguste Edouard Loradoux Bellford.
1289. Thomas Singleton.
1945. John Webster Cochran.

Sealed November 23, 1853.

1267. Auguste Edouard Loradoux Bellford.
1269. John Harcourt Browne.
1271. Henry Turner.
1276. William Babb.
1288. Alexander Porecky.
1311. Illingworth Butterfield.
1313. Ebenezer Nash and Joseph Nash.
1330. William Green.
1332. Richard Archibald Brooman.
1375. John Chisholm.
1382. Thomas Russ Nash.
1536. Noble Carr Richardson.
1576. Williams Rice.
1618. Henry Bate.
1688. Charles Goodyear.
1690. Charles Goodyear.
1731. Thomas Gray.
1772. Benjamin Collins Brodie, junior.
2026. John Macintosh.
2079. Isaac Lowthian Bell.
2094. Edmund Leyland.
2208. James Smith.
2229. John Phillips.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
Nov. 16	3530	H., J., and P. Nicoll	Regent-street	Paletot or coat.

CONTENTS OF THIS NUMBER.

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HUGHES AND DENHAM'S PATENT CIRCULAR WARP AND WEFT LOOMS.

Fig. 2.

HUGHES AND DENHAM'S PATENT CIRCULAR WARP AND WEFT LOOMS.

(Patent dated May 7, 1853.)

This invention consists in weaving fabrics by means of circular machinery, in which the feeds are arranged in sections round a circle, the upper surfaces of which are formed into a circular guide or tramway, on which the bobbin traverses for carrying the weft thread or threads when more than one bobbin or shuttle is or are used. The bobbins are caused to revolve by the rising of the reeds, through the intervention of suitable cams or friction-rollers attached to the centre shaft of the machine. The outer ends of the reeds are centred upon a wire or pin attached to the general framework of the machine. The warp-threads are caused to cross and recross one another, so as to open the sheds for the passage of the shuttle or shuttles, by being passed through heddles pierced through levers, which levers are acted upon by suitable cams or friction-rollers attached to the main shaft. The great advantage said to be gained by this arrangement arises from the large quantity of weft threads which may be continuously supplied, in consequence of so many weft shuttles working simultaneously. In a loom occupying a space of only one yard in diameter, fifty-four weft threads may be laid. The inventors consider that their loom will be found to surpass the power-loom in the weaving of both plain and figured fabrics, and that it may be applied with peculiar advantage to the production of materials to be employed in forming seamless garments.

The character of the improved looms will be more readily seen from the following abstract from the patentees' specification:

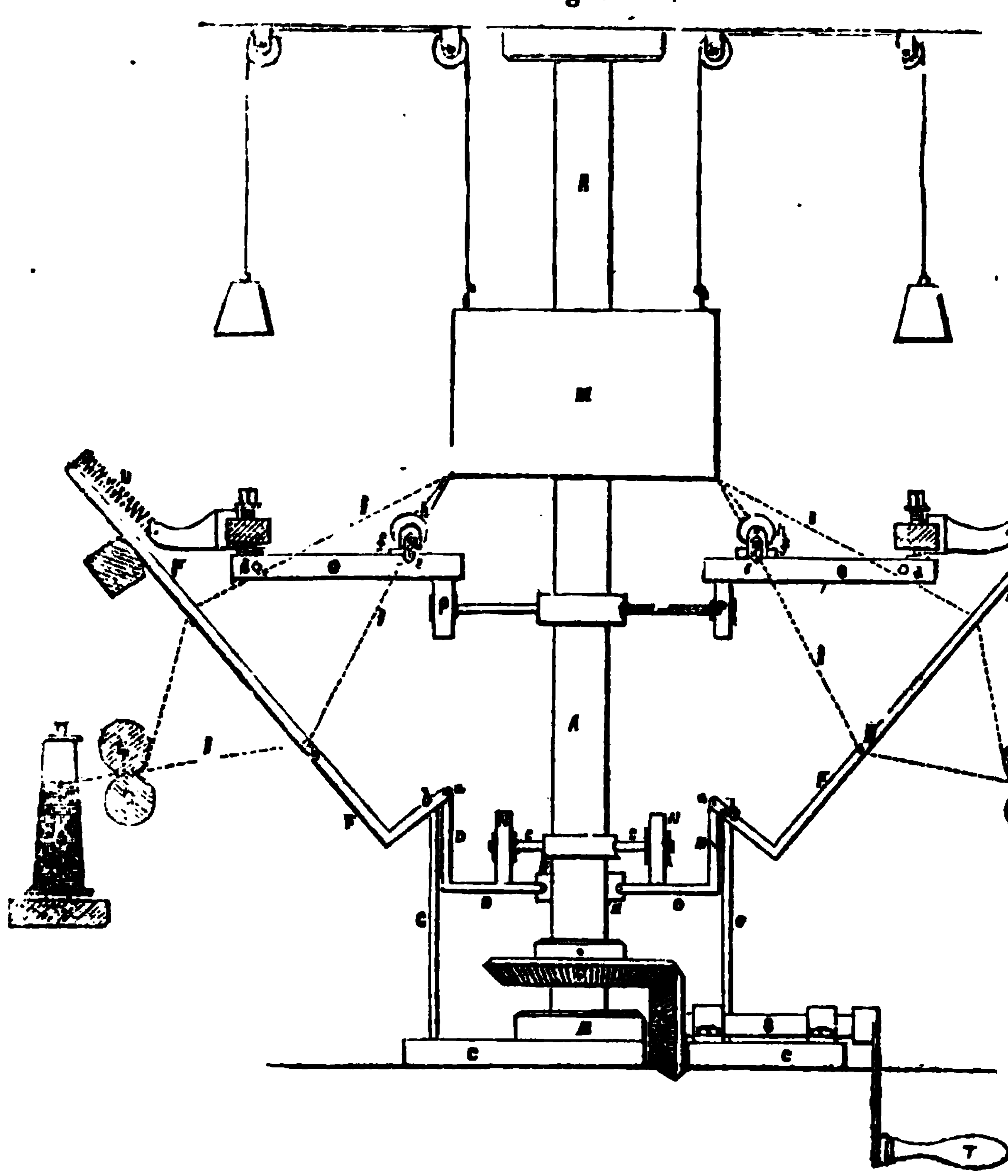
"Fig. 1 of the engravings hereunto annexed represents a sectional elevation of so much of a circular loom as is necessary to explain our invention. A is the central shaft, the lower end of which turns in the step, B, upon the base-plate, C. D is a bent lever, one end of which is centred in the ring, E, which surrounds the main shaft. The upper ends of these levers are connected by the pin, *a*, to a second series of bent levers, F, which are held by a wire or pin passed through the slot, *b*, and supported by the ring, G. H is the heddle-eye, pierced through the lever, F, there being one heddle-eye for each lever in the circle; and I the warp-threads, which are wound round the warp-bobbins, K, and, after passing between the tension-rollers, L, are passed through the heddle-eyes, and carried up to the disc, M, round which the work is formed.

"N is a friction-roller, centred upon the spindle, *c*, attached to the main shaft, and revolving with it. O are the reeds centred upon the pin or wire, *d*, attached to the general framework of the machine. These reeds have cut in them the groove or notch, *e*, which forms a tramway for the passage of the shuttle-carrier and shuttle. This shuttle-carrier is composed of a small plate, *f*, having friction-wheels, *g*, in each end, which traverse in the notches in the reeds, O. *h* is the shuttle upon which the weft-threads are wound. This shuttle is supported and turns in brackets upon the plate, *f*. P is a friction-roller revolving upon the spindle, *i*, attached to the main shaft, A, which, as it rotates, lifts the reeds so as to form an inclined plane, and thereby the shuttle is made to advance and lay the weft-thread between the warp-sheds. The action of this machine is as follows:—Upon motion being given to the central shaft, by means of the bevel-wheel, Q, geared into by the pinion, R, on the shaft, S, driven by the crank-handle, T, the friction-wheels are caused to revolve, and by means of the wheel, N, acting upon the levers, D, and through them upon the levers, F, they are alternately thrust outwards, carrying with them the warp-threads. Upon the levers, D, being released from the roller, N, a helical spring, U, which is attached at one end to a projecting pin upon the end of levers, F, and at the other end to the general framework, causes the levers, F, to be drawn back towards the centre of the machine, and so to cross the warp-threads, and admit of the shuttle passing between and laying the weft to form the fabric. The levers, D, may, if desired, be arranged in sections, so that upon the passage of the friction-roller, N, they are alternately thrust forward and drawn towards the centre, whereby the warp-heads are caused to cross and recross each other for the passage of the shuttle.

"Fig. 2 represents a similar section of a modification of a circular loom, in which the reeds, O, are dispensed with, and the inclination of the levers, F, is reversed, the shuttle being supported in notches or grooves cut in the ends of the levers, F, and caused to revolve

by the crossing and recrossing of the levers behind the shuttle. W W are the cams attached to the main central shaft, and revolving with it for causing the levers to cross and recross each other for opening the warp-sheds for the passage of the shuttle for laying the weft-thread. I I are warp-threads, which are wound round the warp-bobbins, K, and, after passing through the tension-rollers, are passed through heddle-eyes, *a a*, in the levers, F, by which the threads are carried up to the disc, M, where the work is produced.

Fig. 1.



"The shuttle, N, has at top a small friction-roller, *n*, cut with a groove around its periphery, which serves to lay the weft-thread, and at the same time to act as the ordinary reed in pressing the work. The lower end of the shuttle has also a friction-roller, which runs in a groove formed in the levers, F, so as to form an abutment for the friction-roller, *n*. The disc, M, is caused to rise, as the work is produced, by any of the ordinary methods employed in the circular knitting-frames."

SCOTT'S SCREW PROPELLER.

Figs. 1 and 2 are respectively a side and plan view of a two-bladed propeller constructed according to Mr. Scott's invention. D D are the blades of the propellers, which are to be of the form of a portion of a screw, the pitch of which may be varied to suit the circumstances of the particular use for which the propellers are intended. D* are the arms by which the blades are attached to the boss, E; these arms may be cast in the same piece with the blades and boss, or formed in detached parts. The inventor proposes to make the length of the blades, D, equal to three-fourths the diameter of the propeller,

and the width one-sixth of such diameter; but he does not confine himself to these proportions. He also prefers the position of the blades to be such as that the centre of the blade may be in a line with the centre of the boss, as seen in fig. 2. The width of the arms, D^2, he prefers to be about one-fourth of the length of the blades, D, and the length of the arms proportioned to the diameter of the propeller. It will be seen that, by adopting these arrangements, each blade will have a vacant space, Z, between its acting surface and the boss, E, as shown by the letters A, B, C, thereby forming the propelling surface chiefly at the outer edge of the blades, and by the absence of obstruction at the part Z, giving a free passage to the water, thus preventing churning and other ill effects to which screws of the ordinary description are subject. The facility for steering is also increased when the screw is in motion or at rest, as in both cases the passage of the water to the rudder is not impeded to such an extent as with ordinary screws. He does not confine himself to the use of any particular number of blades, nor to the exact details above given, so long as the peculiar form of screw-blade described is employed.

Fig. 1.

Mr. Scott lately exhibited several models illustrative of the principle and construction of his new screw propeller, before the Liverpool Polytechnic Society. He said:

"It is scarcely possible to determine the best pitch for a screw that shall, in every particular, be suitable for the vessel in which it is placed. We may not obtain the required number of revolutions out of the engines, or, on the other hand, we may get too many, thus causing an excessive expenditure of fuel; therefore in neither case are we getting so good a result as we should if the screw were pitched so as to allow the engines to run at the requisite speed. There are also other causes which determine the best pitch and diameter for screws, as they greatly depend upon the run of the vessel and the size of the apertures. Now, as these screws are usually cast in one piece, and of a fixed pitch, it must be obvious that it is scarcely possible to make a screw of the proper pitch and diameter to suit all the requirements of the vessel. Besides which, the expense and loss of time in attempting to make a perfect fixed pitch is enormous. You may make one screw which shall produce a good result, and yet not be the pitch best suitable for the vessel. In fact, until you can procure a screw that you can adjust to any pitch required, all your exertions are in vain.

"To show you the advantage of having a screw that can be altered to find the best pitch, I will give you the result of a trial upon H. M. Steam-ship *Conflict*. The *Conflict* was formerly fitted up with a screw of 16 feet 6 inches pitch, with which she obtained a speed of 9½ knots with 73 revolutions of the engines; afterwards another screw of 20 feet pitch was made, and with this screw a speed was attained of 9·77 knots

with 61¼ revolutions of engines, being a reduction of 11½ revolutions, and saving by the screw of 20 feet pitch nearly one-sixth of the revolutions, with an increased speed of vessel. This fully bears out what I have stated, that we cannot determine the pitch of a screw from which the best results may be obtained; and this, although a great increase over the former screw, may still be far short of the best.

"In all the experiments I have seen or heard of Mr. Griffith's screw, he invariably obtains his best results with a different pitch from that of the screw with which he competes, and the advantage of his screw may not be so much in the form as in its facility of being altered to obtain the pitch most suitable.

"I have been told that there have been several screws tried on the *Frankfort*, and accordingly as the pitch was increased, better results were obtained. How often do we see, in the case of the paddle-wheels which have been in use so many years, that they require to be altered, either in the diameter of the wheels or the size of the floats, which are easily remedied. Not so, however, in the case of the common screw, as usually cast. No such provision exists. It may by chance be the best for the vessel; but, until it is tried with another of a different pitch, there is no certainty.

"Having shown you some of the defects of the common screw, as usually made, I will now proceed to show you how I think I have accomplished what is so much to be desired, namely, a simple and effective method of determining the best pitch suitable for a vessel, and the speed of her engines.

"When this is found, you have not only the best screw suitable to the vessel, but, from the mode of its manufacture, one of the strongest that can be made. The means by which I accomplish this will be apparent from the models before you. The arms and boss are of wrought iron; the arms are turned, and of sufficient strength relative to the screw-shaft; the blades are cast with holes partly through, and afterwards bored out to receive the turned part of the arms; thus, you will see, they easily turn round when required. Now, supposing we have to make a screw for a vessel, we determine upon the diameter and pitch we think best. The screw being made, we fix it in the arms by means of a cotter, &c. The vessel is then tried, and if the engines go too fast, we put her on the gridiron, alter the pitch, and take a note of the results, until we arrive at the pitch most suitable, which being found, we then fix the blades permanently to the arms, and then we possess, in every particular, the best screw we can have for the vessel.

"There are other advantages gained by this mode of manufacturing the screw namely,

"1st. The screw is much lighter and stronger. To prove to you the necessity of having the screw made as light as possible, I may instance a case that lately came to my knowledge, having been communicated to me by the resident engineer:

"One of the screw-steamers in the Mediterranean trade constantly broke her propelling-shaft whilst driving a screw of 39 cwt.; since then, a screw having been made for her of 27 cwt., it is found her propeller-shaft now does its work properly. In a heavy head sea, I am told the effect of a heavy screw falling in the water is rather startling, and has a tendency to shake and strain the vessel, more especially at the stern-post; this we may readily conceive when we call to mind the numerous instances in which screw steamers return to port leaky.

"2nd. The screw can be made suitable to the vessel, so as to obtain the best result out of her, as in the case of the *Conflict*. This steamer has been in commission some years, with, as I have shown you, an unsuitable pitch, and must, therefore, have expended uselessly a great amount in fuel, with an unsatisfactory result as to speed.

"3rd. That in case of a portion of a blade being broken, another blade can be easily put in its place, without the necessity of removing the shaft.

"4th. That in case of having the screw to lift through a well-hole, as adopted in the Royal Navy, the shaft could be made in one piece with the arms, the blades brought close down to the shaft, thus saving the weight of the boss, and by being made in three pieces, could be readily moved."

AGRICULTURAL MACHINERY AND IMPLEMENTS.

THE exhibition of machinery and implements, in connection with the Cattle Show of the Smithfield Club, held last week in Baker-street, was of a very interesting character. We availed ourselves of the opportunity there afforded of inspecting the American threshing-machine, to which we had occasion to make reference in No. 1578 of our current volume. The result of our examination of this machine is an entire confirmation of what we before suggested concerning it; namely, that its novelty consists in but very little more than a mere modification of certain mechanical arrangements already well known and in extensive use. The accompanying engraving, for

which we are indebted to the courtesy of the *Illustrated London News*, represents a longitudinal section of the machine. A is a drum, on which are mounted a series of pegs which, as the drum revolves, pass other pegs arranged in a similar manner on the concave surface beneath. B B is the travelling-apron, formed of a number of wooden rods, the ends of which fit into the links of the endless chain that passes round the iron rollers, K K. C is an axle, carrying blades, which shake the straw as they revolve. D is the fan for driving off the chaff. E is the riddle or hark. F, the screw which returns the chobs that have passed unthreshed through the machine. G, the screw which carries the loose grain up to the incline, down which it passes to be acted upon by the blower. The straw is delivered from the machine, at H, into a cart, or any other convenient receptacle.

Those of our readers who are acquainted with the threshing-machines already in extensive use in this country, will probably read the foregoing description with some surprise, and will be able to estimate the real value of the invention, upon which Mr. Mechi has freely bestowed his praise, and of which English journals have written with so much laudation. Does its novelty consist in the revolving-pegs, or in the travelling-apron, or in the winnower, or in the screw? Or is it not rather to be seen only in the bringing together of these familiar parts into one machine, and mounting it upon wheels? The latter surmise is the true one.

But we must not omit to state, that if the machine exhibited is to be considered a fair specimen of the American machines, as it no doubt is, it is impossible for English agriculturists to adopt them; for of all the machinery and implements exhibited, it was decidedly the most fragile and imperfect. The contrast between it and the machines of Garrett, Ransome, Dray, and other English manufacturers, was certainly very apparent. In fact, we are convinced that a machine similarly constructed, and sufficiently strong to bear the wear and tear of its operation for any reasonable length of time, must necessarily weigh much more than 14 cwt., which is said to be the weight of the American machine. We are anxious to insist upon this point, because

of the error which has been so commonly propagated in unscientific periodicals concerning the relative cost of this and of our own mashines. The fact is, that the low cost of the American machine is entirely due to its inferiority.

We have not space to notice at length the variety of new instruments exhibited, many of which were of evident worth. We especially regret the want of an opportunity to point out what we conceive to be serious defects in the principle of Smith's reaping, and several other machines; there is, perhaps, however, but little necessity for this, since it is a fact, as we are willing to allow, that British farmers generally are not likely to adopt any invention which has not a well-established reputation both for utility and economy. In conclusion, we cannot refrain from pointing out the attempt made to palm off, as Bell's reaper, a machine, of which the form of blade introduced by Mr. M'Cormick was, perhaps, the most conspicuous feature; and we may also add, that Mr. M'Cormick's blades were employed in nearly the whole of the reaping-machines on exhibition.

AN IMPROVED LOCK, BY MR. J. LIDSTONE, DEVONPORT.

This lock is intended chiefly to be used on board ship, where sliding panels and doors are in constant requisition. The projecting part of the bolt is in the form of the letter T, the head of the T being vertical, and entering a narrow opening in a plate let into the edge of the panel. The bolt itself is cylindrical, and can be turned on its axis, so that the T head can assume the horizontal position, when it forms a sort of button, and allows the panels and doors to be slidden along without separating them. The key is only turned once round. The first part of the turn carries a tumbler and delivers the bolt; on further turning it, it raises another tumbler, and draws forward a flat bolt at right angles to the first, and wholly concealed in the lock. This flat bolt carries three teeth, which fit into corresponding cavities in the cylindrical bolt, and, as it moves forward, turns the cylindrical bolt one-fourth round, when the tumbler again falls and retains it in this position. The entire arrangement of the lock is very simple and effective, and there is not much liability to get out of order.

CONSUMPTION OF SMOKE.

Lord Palmerston's recent Act, attaching a heavy penalty to the non-consumption of smoke, in particular districts, after a certain date, has very naturally turned public attention to this subject, and occasioned many applications to us for information concerning the various smoke-consuming furnaces already invented. We can, therefore, no longer defer noticing the matter, especially as the personal interests of the patentees of such furnaces are likely, at such a time, to force very indifferent inventions into undue prominence, and to hinder the adoption of others of a superior character. We will, however, offer a few preliminary remarks which may tend to a better understanding of the process of smoke-consumption than seems at present to be general.

Combustion ordinarily means the chemical combination of oxygen with a combustible substance at a high temperature. It is quite true that oxygen will unite with such a substance at all temperatures, but the heat evolved when these are low is very small, in consequence of the slowness with which the union takes place, and therefore is of little or no use for those purposes to which fuel is ordinarily applied; although the slow development of heat is by no means to be entirely neglected, as it often produces highly important effects, among which are included the interesting and sometimes perilous phenomena of spontaneous combustion. The oxygen usually employed in the combustion of fuel in stoves and furnaces, is supplied by the surrounding atmosphere, which is sometimes driven into the fire by mechanical means, as in the case of blast-furnaces, but generally is drawn to it in sufficient quantities by the natural tendency of the air to fill up the place of the gases that ascend the shaft or chimney. Coal is composed of carbon, hydrogen, nitrogen, oxygen, and sulphur, mixed with iron and various earthy and saline substances. Carbon and hydrogen are the combustibles, and combustion is produced, as we have said, by the chemical union of these with oxygen at high temperatures. Now, were the supply of oxygen and the temperature each sufficiently great, no smoke would be emitted, since the whole of the carbon of which it is formed would combine with the oxygen, and form carbonic acid—a transparent and colourless gas. The object to be attained, therefore, in a smoke-consuming furnace, is the perfect combustion of the whole of the carbon of the fuel, before the products are allowed to leave the furnace and to ascend the shaft. When this is

accomplished, no black carbonaceous substance can, by possibility, be sent abroad either to annoy the citizens in their abodes, or to deface our public edifices, although there will still be the same quantity of deleterious gas diffused in the atmosphere.

From these considerations, it will be seen that Watt perfectly understood the matter, 70 years ago, when he patented a furnace for consuming smoke and obtaining increased heat, which was so constructed as to cause the smoke of the fresh fuel in its way to the flue or chimney, to pass, together with a current of fresh air, through the fuel which had already ceased to smoke, and was intensely hot. From the same considerations, it also appears that the ingenious Mr. Bodmer's furnace, patented in May, 1834, was constructed precisely upon scientific principles; and we are of opinion, that it has never yet been surpassed, except in the details of its construction and operation. In this furnace the fuel was constantly admitted in the front by a sliding door, made to lift up and drop down, so that the quantity of fuel introduced might be regulated without opening the door; whereby the rushing in of cold air was prevented, and consequently a very equable temperature was preserved in the furnace and shaft, a greater quantity of steam than usual was generated, and the injurious action of streams of cold air upon the boiler plates was avoided. The coals thus supplied were carried slowly from the front to the back, so that the carburetted hydrogen liberated at the mouth of the furnace had, in its passage to the chimney, to pass successively over continually hotter portions of the fuel; and thus the whole of the carbon contained in it became combined with oxygen, and formed carbonic acid before it passed off up the shaft. To effect the carrying of the coals from the front to the back of the furnace, Mr. Bodmer employed an arrangement, which he described thus in his specification:—"A propelling, or travelling grate, may be constructed by a series of fire-bars attached to an endless chain passed over conducting rollers, and actuated in any convenient manner; or the frames and fire-bars, or grates, above described, may be connected, by hooks or lashes, one to the other, and be drawn through the furnace instead of being propelled in the manner above described."

Before the expiration of Mr. Bodmer's patent, the same principles were adopted by Mr. Juckes, who patented a furnace in which also the feed is regulated by a slide door, the fire-bars being connected together, and forming an endless chain, which revolves round drums placed at each end of the frame.

Juckes' furnace was at first found to possess many practical defects; but most of these have, by this time, been corrected. There are, however, others still remaining, and such as cannot be removed, since they necessarily result from the method of its construction. These are, first, the reduction of the draught occasioned by the bars blocking up the front of the furnace below; and, second, the inconvenience and expense of replacing and repairing the fire-bars, it being necessary to stop the works while either their replacement or repairs are effected.

In Hazeldine's furnace, also, the feeding is regulated at the front by a sliding plate, and the fuel is transferred from the front to the back of the furnace; but the transfer is effected by an arrangement of rocking, (and not of travelling bars,) which are placed transversely across the furnace. Each of the bars has a descending projection, which, by a second projection, is attached to a moving rack, which, being worked by a tappet on a shaft, communicates a rocking motion to the bars. A ram, fitted on axes, moves forward from the front of the furnace, and allows the fuel to fall on a plate, from which it is pushed on to the first fire-bar by the rammer, as that travels towards the furnace; the fuel is thence pushed on to the second bar by a second rammer, which moves towards the furnace as the other goes back. By this arrangement the fuel is constantly supplied, and the motion of the bars causes it to move towards the back of the furnace. Hazeldine's furnaces have been found to answer satisfactorily, and are, as we believe, cheaper and more compact than Juckes'.

Hall's furnace is constructed with fire-bars, inclined downwards from the front of the furnace, and placed longitudinally, having a motion communicated to them similar to that given to Hazeldine's, and produced in a similar way; that is, by a cam, or tappet, placed upon a shaft at the front of the furnace. This furnace is also fed in the same way as the preceding ones. The royalty demanded by Mr. Hall from persons making use of his furnaces is understood to be so high as to render the expense of them much greater than Hazeldine's and others.

Mr. Stevens, in his furnace, employs revolving bars, which have screw surfaces formed upon them, and revolve in pairs between fixed bars, on which the fuel partly rests. Each bar of a pair revolves in a direction opposite to that in which its fellow moves. He also uses a set of fixed bars at the further end of the others, towards which the fuel is gradually and continually pushed by the screw surfaces. Mr. Stevens' furnace, as will be seen, is

less complicated than those before referred to; and while cheaper also than they, as we understand, is found in practice to be entirely smokeless, as might be expected, according to the principles we have before set forth.

Upon the whole, the most important feature essential to smoke-consuming furnaces, viz., a low first cost, appears to have been too much lost sight of by inventors; and this feature is of especial importance now that the use of them is about to be made compulsory. The prices have hitherto ranged between £200 and £500, and some even exceed the latter sum, while a large yearly expenditure is necessary to keep them in repair, beside, as before remarked, the loss occasioned by stopping the works while the repairs are conducted.

These considerations induce us to believe that the furnace patented some time since by Mr. John Grist will be found more suitable for general and extensive use than the others constructed upon Bodmer's principle. This furnace, which has the advantage of being much less expensive than others, has been already described in our pages (see *Mech. Mag.*, vol. l., p. 108.) We there spoke of it as follows:

"Mr. Grist's revolving furnace is the best of its class that we have yet seen. It is wholly free from two of the greatest practical objections usually urged against furnaces on this plan, namely, the interference with the draught, and difficulty of getting at the fire-bars for the purpose of replacement or repair. The atmospheric air has a free passage from the front to the back of the furnace; the fire-bars are loose, and used either singly or in series of not more than three or four; and when one of the bars, or one of the series of bars, gets worn or damaged, all that is necessary is, to drop a side-flap, take it out, and put in another. Again; the same mechanical movement which causes the hopper to throw a fresh feed of coal into the furnace, pushes simultaneously forward into the heart of the furnace the last preceding supply, which by this time has become thoroughly coked. The feed is thus always kept in an exact ratio with the consumption, smoke is prevented, and the greatest heating effect possible obtained from any given quantity of fuel."

Beside the inventions already referred to, there are many others, of more or less importance, which we have not space now to describe; some constructed upon similar principles to those already alluded to, and others of an altogether different character. One of these, invented by Mr. Sorrell, was lately described at length in our pages (see *Mech. Mag.*, vol. lix., p. 25.) Another arrangement of a smoke-consuming furnace is included in the patent of Mr. Kendrick, to a partial description of whose invention the first article of our last number was devoted. As Mr. Kendrick's is, however, a very superior furnace, of the class in which the fire-bars are fixed, we shall make it the subject of a future article.

PATENT LAW AMENDMENT ACT, 1853.

THIRD SET OF RULES AND REGULATIONS.

By the Right Honourable Robert Monsey Lord Cranworth, Lord High Chancellor of Great Britain; the Right Honourable Sir John Romilly, Master of the Rolls; Sir Alexander James Edmund Cockburn, Her Majesty's Attorney General; and Sir Richard Bethell, Her Majesty's Solicitor General; being four of the Commissioners of Patents for Inventions under the said Act of the 15 and 16 Vic. c. 83.

It is ordered as follows:

Rule VII. of the second set of Rules and Regulations of the Commissioners, dated the 15th October, 1852, is hereby rescinded.

I. Every application for letters patent, and every title of invention and provisional specification, must be limited to one invention only, and no provisional protection will be allowed or warrant granted where the title or the provisional specification embraces more than one invention.

II. The title of the invention must point out distinctly and specifically the nature and object of the invention.

III. The copy of the specification, or complete specification, directed by the Act 16 and 17 Vic. c. 115, sec. 3, to be left at the office of the Commissioners on filing the specification or complete specification, shall be written upon sheets of brief or foolscap paper, briefwise, and upon one side only of each sheet. The extra copy of drawings, if any, left with the same, must be made as heretofore, and according to the directions contained in Rule III. of the Lord Chancellor, dated the 1st October, 1852.

IV. The copy of the provisional specification to be left at the office of the Commissioners on depositing the same, shall be written upon sheets of brief or foolscap paper, briefwise, and upon one side only of each sheet. The extra copy of drawings, if any, left with the same, must be made as heretofore, and according to the directions contained in Rule II. of the Commissioners, dated the 1st October 1852.

V. All specifications, copies of specifications, provisional specifications, petitions, notices, and other documents left at the office of the Commissioners, and the signatures of the petitioners or agents thereto, must be written in a large and legible hand.

VI. In the case of all petitions for letters patent left at the office of the Commissioners after the 31st day of December 1853, the notice of the applicant of his intention to proceed for letters patent for his invention shall be left at the office of the Commissioners eight weeks at the least before the expiration of the term of provisional protection thereon, and no notice to proceed shall be received unless the same shall have been left in the office eight weeks at the least before the expiration of such provisional protection; and the application for the warrant of the law officer and for the letters patent must be made at the office of the Commissioners twelve clear days at the least before the expiration of the term of provisional protection, and no warrant or letters patent shall be prepared unless such application shall have been made twelve clear days at the least before the expiration of such provisional protection: provided always, that the Lord Chancellor may in either of the above cases, upon special circumstances, allow a further extension of time, on being satisfied that the same has become necessary by accident, and not from the neglect or wilful default of the applicant or his agent.

(Signed) CRANWORTH, C.
JOHN ROMILLY, M. R.
A. E. COCKBURN, A. G.
RICHARD BETHELL, S. G.

Dated the 12th December, 1853

THE FRENCH GOVERNMENT AND THE TELEGRAPH.

It was some time ago our pleasing duty, under the above heading, to call the attention of the public to the progressive liberality which had begun to characterise the French government in respect to telegraphic intercourse between the two countries. The measure at that time adopted mainly consisted in the establishment of additional offices and the consequent increase in the number and efficiency of the telegraphic *bureaux*. The French government has now assisted in a still further and much greater improvement. The desirability of a direct service with the English instrument between the two chief capitals of Europe has long been acknowledged, but the impediments existing in the difference of the French and English systems of signalling were almost insurmountable obstacles to so beneficial an alteration. Thanks, however, to the liberal policy of the Emperor, these objections have been overcome, and a direct through service, worked by English instruments upon wires specially devoted to the companies by the French government, has just been established between the two capitals. Signals transmitted from the central offices of the Submarine and European Companies, Cornhill and Regent-circus, Piccadilly, appear directly upon the dial of the instruments at Paris; the delay of intermediaries is avoided, and the liability to error very much diminished from the simplification of the transmitting *media*. Coupled with these direct advantages, collateral facilities have been also obtained, which very much expedite business with other parts of France and Italy, and with Germany generally. A reduction in the charges of the Submarine and European Companies has also been effected; up to the present time each numeral counted as one word; the companies have now established the system of counting a mass of five numerals as one word. This will make an enormous difference; for instance, the figures 10385 under the old system counted as five words, while the new method of counting will reckon them as one word. The French government has not, however, stood alone in its progressive telegraphic reforms; the government of Belgium has also acceded to a direct communication, with English instruments, between London and Brussels; and in like manner signals sent from Cornhill appear on the face of the instrument at Brussels, without the interference or assistance of intermediate stations. The beneficial effects of these arrangements have been proved by the rapidity with which messages to and from London and Paris, Brussels, Berlin, Vienna, &c., have lately reached their destinations. Messages from Vienna and other distant parts, under two hours, have become common; and it is hoped that some fresh arrangements even now in contemplation will afford the public still greater reason to congratulate itself not only on the modernized ideas of foreign governments, but also on the results which such ideas promise yet to bring forth.—*Times.*

TRANSPORTING ICEBERGS.

To the Editor of the Mechanics' Magazine.

SIR,—Will you allow me to ask your scientific readers whether it is possible, and if so, practicable, in a mercantile point of view, to send a steam boat, laden with coals, to the banks of Newfoundland, to tow home

an ice-berg? One of 10,000 tons would be very small; and there being no dock dues or loading charges, her detention would not be great. I suppose it would be worth 15s. per ton here; what it would be worth in the East Indies I cannot say, or what it might, "as a novelty," be worth to look at, I cannot say; but this I think, it would pay well.

I am, Sir, &c.,
GEORGE FIRMIN.

Bath, Dec. 12.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

WILLIAM WEATHERLY and WILLIAM JORDAN, of Chatham, Kent, engineers. *Improvements in the stuffing-boxes of piston-rods.* Patent dated May 26, 1853. (No. 1300.)

This invention consists of a combination of several metal split or divided rings, with angular or wedge-formed sections. Two forms of rings are used—one form with its widest part inwards, and inclining outwards; rings of the other form have their widest surfaces outwards, and incline inwards. These are placed in alternate succession around the piston-rod, and within a stuffing-box, the cover of which is kept down by screws and nuts, or with springs.

Claim.—The mode of making stuffing-boxes, as described.

JULIUS AUGUSTUS ROTH, of Philadelphia, Pennsylvania, chemist. *Improvements in the mode of, and machinery for, treating the fibres of flax, hemp, china-grass, and other analogous substances preparatory to spinning.* (Partly a communication.) Patent dated May 26, 1853. (No. 1302.)

The improved apparatus which the inventor describes and claims consists—

First. Of a series of combs, and of a frame to which the combs are attached, for the purpose of supporting the flax in a loose or open state, whereby the manufacturer is enabled properly to expose it to the chemical action of certain solutions.

Second, of a series of vats furnished severally with a set of moveable squeezing rollers, in each of which vats the frame just mentioned, when charged with flax, is successively suspended for the purpose of saturating the flax. The use of the squeezing rollers is to deprive the flax, when withdrawn from the successive vats, of the greater portion of the solution which it has absorbed by being immersed therein.

Third, of a revolving frame to which the flax combs are to be attached, for the purpose of being rotated in a heated atmosphere, and thereby rapidly and effectually dried.

WILLIAM HENHAM, of East Peckham, Kent, farmer. *Certain improvements in ploughs.* Patent dated May 27, 1853. (No. 1303.)

Claims.—1. The cranking of the axle of the fore carriage for the purpose described, and to be used with "turn-wrests" or the mould-board, as described.

2. The cranking of the coulter, as described.

3. The formation of the upper and lower "turn-wrests," so as to be capable of acting upon the furrow in the manner described.

4. The formation of a mould-board capable of acting upon the same principle as the "turn-wrests," as described.

ARISTIDE MICHAEL SERVAN, of Philpot-lane, London. *Improvements in treating fatty matters to render them suitable for the manufacture of candles.* Patent dated May 27, 1853. (No. 1306.)

Claim.—The acting on "elaidine" or "elaidic acid" (by whatever means the same may be obtained) with sulphuric acid.

ALEXANDER KEILLER, of Dundee, Scotland, confectioner. *An improved machine for the manufacture of confections, including all kinds of comfits known by the trade as pan-goods.* Patent dated May 27, 1853. (No. 1308.)

Claims.—1. The employment of open pans or vessels heated by steam, and provided with agitators and discs, in the manner described.

2. The arrangement and combination of apparatus for imparting a reciprocating motion to vessels containing melted materials, suspended above the pan in which the confectionery or other articles are made, as described.

3. The method of manufacturing pearled or crusted goods by means of vessels containing melted materials suspended immediately over the pan, and having a reciprocating motion communicated to them.

WILLIAM WOLFE BONNEY, of Brompton, Middlesex, gentleman. *Improvements in machinery for raising a pile or flue by abrasion on linen, cotton, silk, and other fabrics.* Patent dated May 27, 1853. (No. 1309.)

Claim.—An arrangement of machinery described, and the combination and working of the parts thereof as described, in such manner as to imitate the action of the hand and knife in the manufacture of lint by manual labour.

WILLIAM HENRY BENTLEY, of Bedford, Bedford, whitesmith and engineer. *Improvements in locks and keys, parts of which are applicable to window-sashes and doors.* Patent dated May 27, 1853. (No. 1310.)

A description of this invention will form an article of a future number.

Illingworth Butterfield, of Bradford, York, manager. *Improvements in, and applicable to looms for weaving.* Patent dated May 28, 1853. (No. 1311.)

Claim.—Self-acting temples, or weftholders described, or any equivalent machinery, whereby each shoot of weft is held at the selvege of the fabric, while the shuttle is crossing the shed.

William Smith, of Salisbury-street, Adelphi, London, civil engineer. *Certain improvements in the machinery for, and method of making and laying down submarine and other telegraph cables, which machinery is also applicable and is claimed for the making of ropes and cables generally.* Patent dated May 28, 1853. (No. 1312.)

This invention consists in certain novel arrangements of machinery for the making of sub-marine and other telegraph cables, wire, and other ropes, lines, and cables, in such manner that it is practicable to erect it of a sufficient size and power on board a ship, or other suitable vessel, when intended for making sub-marine and other such cables, to make the same on board of such vessel, either for the greater convenience of shipping or transporting it when made; or, when desirable (as for very long and continuous lengths of trans-oceanic lines of electro-telegraphic connection and communication), making the cable at sea, and testing the same while in course of manufacture —and when so tested, and found to be perfect, paying out and submerging the same at a suitable velocity, rendering the connection of a number of short and separate lengths of cable (which it is believed is impracticable at sea) unnecessary, and thereby avoiding the risk of imperfect continuity and union common to such a plan, producing an uniformly strong and continuous line of submarine communication.

Claims.—1. The arrangement of machinery described.

2. The setting up the machinery on board the vessel in the manner, and for the purposes described.

Ebenezer Nash, of Duke-street, Lambeth, tallow-chandler, and Joseph Nash, of Thames-parade, Pimlico, chemist. *Improvements in the manufacture of wicks.* Patent dated May 28, 1853. (No. 1313.)

Claim.—The use and application of flax, hemp, and such like fibrous materials, rendered suitable by preparation to the manufacture of wicks for candles and lamps.

George Harriott, of Islingham, Frindsbury, Kent, gentleman. *Improvements in agricultural implements employed in crushing and rolling land, and in frames for the same.* Patent dated May 28, 1853. (No. 1314.)

Claims.—1. The constructing of implements for crushing and rolling land from a cylinder or cylinders with a screw thread on the outer surface, as described.

2. The constructing of compensating spring-frames for rollers employed in the rolling and crushing of land.

Caleb Hill, of Cheddar, Somerset, stay manufacturer. *Improvements in the construction of stays.* Patent dated May 28, 1853. (No. 1316.)

The improvements in the body of the stay or corset consist in inserting gores or gussets of elastic material in the bosom of the stay or corset, which, by yielding laterally, will allow for the expansion of the chest. In order to provide a means for increasing or diminishing the capacity of the stay, the back part is made open to within about 6 inches from the top edge, and the adjacent edges are provided with eyelet holes for the insertion of a stay-lace, so that the stay may be tightened or let out at pleasure.

Claims.—1. The manufacture of metallic fastening, as described, wherein a hook catching laterally and a sliding bolt are combined.

2. The improvements above described in relation to the body of the stay.

Francois Francillon, of Puteaux, France. *Improvements in dyeing and printing silk, wool, and other animal fibres.* Patent dated May 28, 1853. (No. 1317.)

Claim.—Dyeing and printing animal fibres, such as wool, silk, hair, feathers, or skins, by means of chromic acid, or its combinations, which may be reduced and converted into a chromic oxide, and fixed by any convenient chemical means, as described.

Daniel Bateman, of Low Moor, near Bradford, York, card maker. *Improvements in carding wool and other fibrous substances, and in the manufacture of cards for that purpose.* Patent dated May 28, 1853. (No. 1318.)

Claims.—1. The introduction of steam into the interior of carding cylinders, or cylinders covered with cards, and employed for carding wool and other similar fibrous substances.

2. Manufacturing cards (to be applied to such heated carding cylinders) with backs composed of metal, combined with vulcanised India-rubber, or with cotton, linen, or woollen cloth, or with any combination of these materials, and the application of the same in the manner and for the purposes described.

Edward Duclos de Boussois, of Paris, mining engineer. *Improvements in preventing incrustation of steam-boilers.* Patent dated May 28, 1853. (No. 1321.)

The object of this invention is to combine the use of muriatic acid and muriate of barytes at one and the same time.

Claim.—The use of muriatic acid and muriate of barytes combined; also the use of carbonate of lime, as described.

ALFRED WHALEY SANDERSON, of Cable-street, Lancaster, tea, coffee, and spice merchant. *Improvements in preparing effervescing powders.* Patent dated May 28, 1853. (No. 1323.)

Claims.—1. The mode of preparing powders for the production of aerated or effervescing beverages, as described.

2. The mode of mixing together, in a dry state, large quantities of the several ingredients of effervescing powders, and then making up the combined mass in small packets, requiring the addition of water only when being used, as described.

3. The preparation of effervescing powders by placing the required quantities of the necessary ingredients in separate and individual cases or packages, to the amount intended for individual drinking.

JOHN HENRY JOHNSON, of Lincoln's-inn-fields, Middlesex, gentleman. *Improvements in removing the gummy or glutinous matter from textile and other materials.* (A communication from Messrs. Alcan and Limet, of Paris, France, civil engineers.) Patent dated May 28, 1853. (No. 1324.)

Claims.—1. The system or mode hereinbefore described for preparing cocoons by the consecutive application of steam, vacuum, and pure water, or a solution of soap or alkali.

2. The use of net bags, in which the cocoons are put during the purification, and with which the ends of the threads are easily found, without having recourse to the brooms and beating process.

3. The double perforated moveable bottom of the reservoirs, to prevent the cocoons from falling to the bottom.

4. The mode described of treating flax, hemp, or any other similar fibrous materials.

JOSEPH BROWN, upholsterer, Leadenhall-street, London. *Improvements in elastic spring beds, mattresses, cushions, and all kinds of spring stuffing for upholstery work generally, making them lighter and more portable.* Patent dated May 30, 1853. (No. 1325.)

Claim.—The adaptation of India-rubber, or other elastic material, as a substitute for springs for promoting elasticity in mattresses, cushions, and all kinds of spring stuffing, and upholstery work generally; and also the suspending, by means of India-rubber, or other elastic material, beds, mattresses, seats, and cushions.

JOHN MACDONALD, of Henry-street, Upper Kennington-lane, Vauxhall, Surrey, machinist. *Improvements in, and applicable to lamps; also applicable to apparatus for light-house signal purposes, part of the invention applicable for other useful purposes.* Patent dated May 30, 1853. (No. 1327.)

Claims.—1. "The configuration of the reflector or reflectors with the arrangements for the position of the burner or burners, and the proportions of the flame of light or lights with the proportions of the reflector or reflectors."

2. "The configuration and position of the protecting glass or glasses for the emission of surface light, with the expansion of 160° or more of a circle of reflected light from the centre of the burner."

3. The position of the signal glass or glasses, with the facility for signalising, or for effecting changes for signal purposes.

4. The application of this invention to apparatus for light-house signal purposes.

5. The application of part of this invention for the radiation and reflection of heat and light, or for heating purposes principally.

JULIAN BERNARD, of Guildford-street, Russell-square, Middlesex, gentleman. *Improvements in obtaining differential mechanical movements.* Patent dated May 30, 1853. (No. 1329.)

This invention relates to the obtainment of variable movements, suitable for various engineer's tools, such as slotting-machines, in which it is necessary to have a comparatively slow movement whilst the cut is taking place, but a quicker action for the return movement. As applied to such a machine, for example, this improved plan is carried out by employing a species of double-geared connection between the driving shaft and the slotting crank or disc for actuating the cutting tool. During the cut the slotting shaft is driven at a slow rate by a large wheel upon that shaft in gear with a pinion upon the first motion shaft; this gearing being so contrived by means of a wedge or inclined connection between the pinion and its shaft, or by a species of ratchet-clutch or frictional helix, as that the shaft and pinion shall only be in driving gear in one direction. A secondary connection is also formed between the driving shaft and the slotting shaft, by means of a pair of friction-pulleys, the relative sizes of which are arranged so as to give the slotting shaft a quicker speed than that given by the wheel and pinion arrangement. One half of one of these pulleys is reduced in radius, so that it disengages itself from its neighbour at each half turn. The result is that the two pulleys come into actuating gear at the termination of each cutting stroke, and the slotting shaft is thus carried round at a quicker rate than that due to the driving pinion, which allows the shaft to revolve within it. But when the quicker

back-stroke is accomplished, the pulleys come out of gear and the pinion is again allowed to drive the slotting shaft.

William Green, of Islington, Middlesex, engineer. *Improvements in treating or preparing yarns or threads.* Patent dated May 30, 1853. (No. 1330.)

This invention consists—*First*, in certain modes of applying colour, so as to produce a greater depth or intensity thereof than is ordinarily obtained. *Secondly*, in producing glossy effects upon yarns or threads, by covering them entirely over with metallic powder. *Thirdly*, to coating yarns or threads with metallic solutions, pigments, or compositions. *Fourthly*, to certain modes of burnishing or brightening yarns or threads. And, *Lastly*, in producing figured or ornamental fabrics, by printing or otherwise imparting a metallic line or pattern, or a line or pattern in dry powdered colours generally upon yarns or threads.

John Champney Bothams, of Vine-cottage, Londonderry-road, Camberwell-green, Surrey. *Improvements in condensing steam engines.* Patent dated May 30, 1853. (No. 1331.)

Claims.—1. The obtaining a circular motion by combining an engine or engines of two different forms, the one being a cylinder with a piston moving backwards and forwards, in the direction of the length of the cylinder, and the other being a case or portion of a cylinder in which a piston has an oscillating or pendulous motion, which is communicated to the cylinder of the former.

2. Fixing the centre of gravity of the part having a pendulous motion, the proper distance below the axis of suspension.

3. Relieving the sheet metal from the pressure of the atmosphere, by pumping cold water into the condenser, in the same quantity and at the same time, as the water which has been used for condensing is pumped out.

4. The relieving the sheet metal from inequality of pressure, between the space into which the steam is admitted and the space containing the condensing water, by connecting those two spaces by means of a trap or syphon, kept full of water, derived from the condensed steam.

5. The application of apparatus for preventing the pressure of the atmosphere forcing water into the pump, and through the valve into the condenser, when an equal quantity is not at the same time pumped out of the condenser.

Richard Archibald Brooman, of the firm of Robertson, Brooman, and Co., 166, Fleet-street, London, patent agents. *Improvements in fire-arms.* (A communication.) Patent dated May 30, 1853. (No. 1332.)

Claims.—1. Cutting slots in the tubes of the magazine, and combining with each tube a spring connected to a ring, moving on the outside, for feeding up the spring and maintaining the compressed position given at the time of charging the tubes with the ammunition, as described, whereby such charge is forced into the conveyer by a power independent of gravity; also the piercing of the hole communicating with the powder, as described.

2. Combining the tube magazine with the conveyer in such manner that it will be caused to revolve, so as to bring each tube of the series successively opposite to the hole or cavity, through which the charges are fed, to the conveyer as fast as they are transferred to the barrel.

3. A follower in combination with the cavity of the conveyer, and the lever for ejecting the charge into the barrel.

4. A cam groove in combination with finger levers, and a cap case to regulate the feed of the caps.

5. A needle or point in the cavity, against which the charge may be driven, as described.

6. A cap magazine consisting of a case lying parallel to the barrel, and capable of being moved backwards and forwards, so as to actuate a feeding slide, and deliver the caps upon the nipple at the proper moment, as described.

William Brooks, of Chancery-lane, Middlesex. *Improvements in stoves and grates, or fire-places.* (A communication.) Patent dated May 31, 1853. (No. 1334.)

The inventor describes and claims certain improvements, which consist in applying glass silvered on one side to fire-places in such manner that the heat from the burning fuel in such fire-places will be readily reflected into the apartment in which they are situated.

George Goodlet, of Leith, Midlothian, Scotland, postmaster. *Improvements in engines to be worked by steam, air, or air and water combined.* Patent dated May 31, 1853. (No. 1336.)

The inventor says, "The principal part of the effect upon the piston is produced by the pressure of the steam at the beginning of its course, and under my invention it is intended that this effective action should be repeated at the shortest intervals; and the parts of the engine are so arranged as to admit of their being successively transmitted, without loss of time, to the crank-shaft of the engine." He claims a general combination and arrangement of parts, as described.

Hesketh Hughes, and William Thomas Denham, both of Cottage-place, City-road, Middlesex, engineers. *Improvements*

in pianofortes. Patent dated May 31, 1853. (No. 1337.)

This invention consists in effecting the production of powerful sounds until the fingers are withdrawn from the keys, by means of cam-wheels, or similar contrivances, which act upon levers thrust in beneath the rods of the hammers when the keys are depressed. Two hammers are placed to each key, and the cam-wheels are so arranged that the hammers are brought successively into action upon the wires, so that before the effect produced by one blow of one hammer ceases, the other hammer is brought into play; and as long as the finger is kept on the key, the hammers continue striking. Modifications of this arrangement are described by the inventors.

Claim.—The several methods of and arrangements for the described striking action of pianofortes.

William Edward Newton, of Chancery-lane, Middlesex, civil engineer. *An improved construction of hand-stamp.* (A communication.) Patent dated May 31, 1853. (No. 1338.)

Claim. — Constructing hand-stamps in such manner that the stock, or part containing the letters, figures, or devices, may have motion an a centre pivot, or joint, so that it may, when used, be brought down flat upon its face, and thus give a clean and perfect impression, whether the stock be held in a perfectly vertical position or somewhat obliquely, as is frequently the case.

Joseph Morris, of Astwood Bank, near Redditch, Worcester, manufacturer. *An improvement or improvements in the manufacture of envelopes for needles.* Patent dated June 1, 1853. (No. 1339.)

Claim.—Cutting out pieces of paper of a suitable form to be folded and made into envelopes for needles, and piercing holes in the same for the reception of the tucks, by means of dies, worked by a screw or other press.

Edward Wilkins, of Queen's-road, Walworth, Surrey, gentleman. *Improvements in pots and vessels for the growth and cultivation of plants.* Patent dated June 1, 1853. (No. 1340.)

This invention consists in so shaping flower-pots, and such like vessels, as to form a reservoir for the supply of liquid manure or gas to the plants grown in them, such reservoir being capable of being closed for the purpose of preventing the escape of any offensive odours or of gas, as described.

Alfred Hardwick, of Chatham-street, Liverpool, Lancaster. *Improvements in propelling vessels.* Patent dated June 1, 1853. (No. 1341.)

Claims.—1. The use of a double-action force-pump or pumps for propelling vessels.

2. The adjustment of the area of the propeller-piston or pistons, and the ejection-pipe or pipes, or waterways, so as to cause the water to be ejected therefrom with a velocity of more than four times the speed of such propeller.

3. The use of valves for reversing the propelling action, and thereby the motion of the vessel.

4. The combination of various parts of the machinery for propelling vessels, as described.

Maxwell Scott, of Birkenhead, Chester, engineer. *Improvements in propelling.* Patent dated June 1, 1853. (No. 1345.)

This invention is described in a previous article in this Number.

The inventor claims the construction of a screw propeller with blades, of the form described in the article just alluded to; also, a mode of affixing the blades of screw propellers by means of arms, on which they are carried, and an arrangement for feathering or altering the pitch of the blades of screw propellers, as described.

James Stocks, junior, of Ovenden, Halifax, York, manufacturer. *Improvements in looms for weaving.* Patent dated June 1, 1853. (1346.)

Claim.—The method of working the riser of the shuttle-box by means of portable cams or segments (varying in form and size according to the pattern required) acting on the lever and vertical rod, as described.

Admiral the Earl of Dundonald, of Belgrave-road, Middlesex. *Improvements in apparatus for laying pipes in the earth, and in the juncture of such pipes.* Patent dated June 1, 1853. (1347).

The apparatus consists in a carriage having a coulter or cutter for vertically parting the earth, and a horizontal tool attached thereto, similar to that of a drain-plough, whereby an aperture or channel is formed. From the upper and foremost part of the carriage a duct or opening descends to the tool in any convenient direction, through which drain or other pipes may be introduced and *continuously* deposited in the channel or opening formed by the progressive motion of the apparatus.

Claim.—The means described of depositing pipes continuously in the earth, one after another.

William Knowles, of Boulton-le-Moors, Lancaster, cotton spinner. *Improvements in machinery for warping and beaming yarns or threads.* Patent dated June 2, 1853. (1348.)

Claim.—The application to machines for warping and beaming yarns or threads of

self-acting machinery, by which such machines are stopped when any of the yarns or threads break, or otherwise cease to be supplied.

JOSEPH WHITWORTH, of Manchester, Lancaster, engineer. *Improvements in machinery for perforating or punching paper, card, and other materials.* Patent dated June 2, 1853. (No. 1350.)

This invention consists in an improved combination of punches and dies, with machinery for actuating the same, particularly applicable to perforating the paper used in communicating intelligence by electric telegraphs.

JOHN ROBERT JOHNSON, of Stanbrook-cottage, Hammersmith, Middlesex, chemist. *Improvements in the manufacture of type, and articles used in letter-press printing.* Patent dated June 2, 1853. (No. 1351.)

According to these improvements the mould in which a type, or other article is cast, is composed of four parts and a matrix, two of which parts (the sides) are fixed in a plate or table parallel to each other. Another part (the body-piece) slides up between the two fixed ones, and at one time forms one side of the mould, and at another time is the means of delivering the cast type or other article from the mould. This part also carries a register to gauge the position of the matrix. The fourth part (or top) slides over the opening between the two fixed sides, and moves away the cast type or other article on to an inclined shelf, which has a movement to and from the opening between the fixed sides of the mould. The fourth side, or top, also carries a register for the matrix, so that by placing a different size of matrix between the two registers, the mould will be adjusted for the change of thickness.

Claim.—The combination of parts described.

WILLIAM THOROLD, of Norwich, civil engineer. *Improvements in the construction of portable houses, and in the machinery for raising, moving, and lowering the same.* Patent dated June 2, 1853. (No. 1352.)

The peculiarity of this method of building consists in introducing suspension-rods, which, being fixed to the sills or lower parts of the building, admit of the buildings being slung up without injury. The inventor describes certain machinery for transporting the portable houses.

RICHARD LONGDEN HATTERSLEY, of Keighley, York, machine-maker. *Improvements in machinery for forging iron and other metals.* Patent dated June 2, 1853. (No. 1353.)

Claim.—The forging of steel, iron, or other malleable metals, to form the flyers of machinery employed in the spinning and doubling of fibrous materials, or other like articles, by means of swages, dies, or hammers, each having two or more distinct surfaces which answer different purposes in such forging operations; such swages, dies, or hammers being actuated or worked by mechanical means.

WILLIAM HAMMOND SMITH, of Gloucester-row, Walworth. *Improvements in the manufacture of parchment.* Patent dated June 2, 1853. (No. 1354.)

The skin is first stretched on a frame, and subjected to the operation called "filling." It is then scalded and rubbed while wet with whiting, and afterwards rubbed on each side with pumice-stone and whiting, and finally a composition formed of French chalk, whiting, and size, is applied in a similar manner to that employed in the manufacture of writing-vellum.

The inventor claims the above method of manufacturing parchment.

HESKETH HUGHES and WILLIAM THOMAS DENHAM, both of Cottage-place, City-road, Middlesex, manufacturers. *Improvements in machinery for weaving.* Patent dated June 2, 1853. (No. 1356.)

Claim.—The laying of the weft thread or threads in circular weaving machines by means of a ring having a space cut out of it for the crossing and re-crossing of the warp threads, as described.

WILLIAM BOYD, of Belfast, Ireland, manufacturing chemist. *Improved apparatus for manufacturing chlorine and chlorides.* Patent dated June 2, 1853. (No. 1359.)

Claim.—The construction of stills by combining cast-iron and fire-bricks, or tiles, with a cement which is capable of protecting the iron from the corrosive effects of the chemical agents employed in the manufacture of chlorine and chlorides.

WILLIAM EDWARD NEWTON, of Chancery-lane, Middlesex, civil engineer. *Improvements in the manufacture of soles for boots, shoes, and other coverings for the feet.* (A communication.) Patent dated June 2, 1853. (No. 1360.)

Claims.—1. The making of soles of India-rubber or gutta percha in moulds on a roller, by the pressure of the periphery of one or more rollers against the material while it is passing between them.

2. The making of a continuous sheet of soleing of India-rubber or gutta percha, consisting of fore-part, shank, and heel, by means of two or more rollers, and then cutting it out in the shape of the sole by passing it between other rollers having on them cutting patterns.

3. The making of soles by means of a continuous plain sheet of the above materials, portions of which, while passing between the rollers, are pressed into the

moulds on the rollers by other equivalent means.

4. The openings or channels in the mould, through which a connection is left between the plastic materials in the mould and the sheet, and by which the sole may be withdrawn from the pattern or mould.

5. The making of a continuous sheet of soleing by means of rollers heated by steam, or other equivalent means, by which the materials, in passing between them, are heated or preserved in a heated, soft, and plastic state, fitted to receive impressions, or to be moulded into soles, as specified.

JEAN DURANDEAU, junior, of Paris, France, of the firm of Durandeau, junior, and Chauveau. *Certain means of obtaining marks and designs on paper.* Patent dated June 3, 1853. (No. 1362.)

This invention consists in engraving, on a sufficiently hard metallic plate, the mark or design wished to be obtained on the paper, and in passing this engraved plate, with the satining metallic sheets, between the cylinders of a laminating machine, the pressure forcing the metallic sheet to penetrate into the hollow of the engraving, and making a relieve on the said sheet.

Claim.—The means described of obtaining upon paper, manufactured mechanically and in a continuous manner, marks and designs similar to those obtained by the aid of water-marks in paper made by hand, these designs being obtained during the operation of satining.

FERDINAND LOUIS GOSSART, of Rue Montmartre, Paris, France. *A system of permanent circulation of caloric, intended to produce and overheat steam, gas, and liquid.* Patent dated June 3, 1853. (No. 1363.)

Claims.—1. The employment of conducting fragments to multiply interiorly the heating and condensing surfaces.

2. Two processes by which the continuous circulation of the caloric is established; that is to say, the employment of double pipes and of liquid conductors for intermedia.

3. The general arrangement of apparatus, by means of which the liquid steam or gas is heated or cooled in small portions and gradually, in such a way that there is never a combination of two portions of liquid steam or gas unequally heated.

PROVISIONAL PROTECTIONS.

Dated October 19, 1853.

2407. Peter Armand Lecomte de Fontainemoreau, of South-street, Finsbury, London. An improved composition to be applied in substitution of bone and horn. A communication.

Dated October 24, 1853.

2454. Charles Fly Blunt, of Montague-place, Russell-square, Middlesex. An improved artificial fossil coal-fuel, which he desires to denominate "Blunt's diamond coal-fuel."

Dated November 17, 1853.

2668. Charles Burton, of New Oxford-street, Middlesex, carriage-manufacturer. Certain improvements in hand and draught carriages for common roads.

Dated November 23, 1853.

2720. Henry Robert Abraham, of Howard-street, Strand, Middlesex. Improvements in coffins and in hearses, and improvements in receptacles for coffins for their transmission.

2721. Charles Frederick Stansbury, of the firm of Nourse and Co., of Cornhill, London. An apparatus to be attached to a drill for sowing grain or other seeds for the purpose of mingling guano or other pulverized manure with the grain or seed to be sown, and depositing it in the ground at the same time with the seed, thereby greatly diminishing the quantity of guano or other manure required to produce the best fertilizing effects. A communication from Thomas Frederick Nelson, of Clarke County, Virginia, in the United States of America.

2722. John Fielding Empson, of Birmingham, Warwick, manufacturer. Improvements in the manufacture of wire.

2723. John Hill, senior, and John Hill, junior, both of Manchester, machine-makers. Improvements in machinery for winding, doubling, and spinning silk.

2724. Joseph Amos, of Bristol, Somerset. Improvements in preparing wood to be employed in the manufacture of casks and other vessels for containing liquids.

2725. John Timewell, of Duke-street, Saint James, Middlesex, tailor. Improvements in cutting or shaping materials to be employed in the manufacture of articles of dress.

2726. James Dilks, of Parliament-street, Nottingham, lithographer and embosser. Improvements in bands for binding more effectually than heretofore packets or parcels of lace and other articles.

2727. Edward Wilkins, of Queen's-row, Walworth, Surrey, gentleman. An improvement or improvements in draining land.

2728. William Beckett Johnson, of Manchester, Lancaster, manager for Messrs. Ormerod and Son, engineers and ironfounders. Improvements in steam engines.

2729. John Drumgoole Brady, of Cambridge-terrace, Middlesex, Esq. An improved mode of, or a new arrangement of, straps for slinging knapsacks.

2730. Thomas William Kinder, of Dublin, Ireland, engineer. Improvements in the construction of the permanent way of railways.

Dated November 24, 1853.

2731. James Lovell, of Glasgow, Lanark, Scotland, gentleman. Improvements in the application of heat to various useful purposes.

2732. David Chalmers, of Manchester, Lancaster, manufacturer. Improvements in railway breaks and signals.

2733. Hugh Mason, of Ashton-under-Lyne, manufacturer, and John Jones, of Manchester, machine-maker. Improvements in machinery or apparatus for doubling, twisting, and spooling woollen, cotton, and other yarns.

2734. Stephen Holman, of Colney-hatch, Middlesex, engineer. An improved construction of double-action pump.

2735. Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. A novel

construction of apparatus to be used as a chest-expander and as a uterine or abdominal supporter. A communication.

2736. Evan Matthew Richards, of Swansea, Glamorgan, merchant. Improvements in feed-plates to be used for oxidizing lead and refining silver and lead.

2737. Samuel Cunliffe Lister, of Manningham, York, manufacturer. Improvements in combing wool, cotton, and other fibrous material.

2738. Elmer Townsend, of Massachusetts, United States. New and useful improvements in machinery for sewing cloth or other material. A communication from William Butterfield, of Massachusetts.

2739. William Jones, of Kilney Cottage, Swansea. Improvements in rotatory engines.

2740. Daniel Lancaster Banks, of St. James-place, Toxteth-park, Liverpool. Improvements in rotatory engines.

Dated November 25, 1853.

2742. Davidson Nichol, of Edinburgh, Scotland, stationer. Improvements in the manufacture of envelopes.

2743. John Berry, of Manchester, Lancaster, warehouseman. Improvements in the machinery or apparatus for manufacturing wire fencing.

2744. William Calder, of Glasgow, Lanark, North Britain, manager. Improvements in the treatment and finishing of threads or yarns.

2745. William Leigh Brook, of Meltham Mills, near Huddersfield, York, cotton-spinner, and Charles Brook, jun., of the same place, cotton-spinner. Certain improvements in preparing, dressing, finishing, and winding cotton and linen yarns or threads, and in the machinery or apparatus connected therewith.

2746. Alexander Drew, of Glasgow, Lanark, North Britain, calico-printer. Improvements in ornamenting woven fabrics and other surfaces.

2747. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in carding engines for carding cotton and other fibrous materials. A communication from George Wellman, of Lowell, United States.

2748. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in the production of printing surfaces. A communication from Auguste Feldetrappe, of Paris, engraver.

2750. Auguste Edouard Loradoux Bellford, of Castle-street, London. Improvements applicable to pens and pencils for writing or drawing. A communication.

2751. Auguste Edouard Loradoux Bellford, of Castle-street, London. Improvements in rotary engines. A communication.

2752. Charles Calixte André Grenier, merchant, of Paris, France. Improvements in the preparation of paints for buildings and other uses.

2753. Enoch Wilkinson and William Rye, both of Oldham, Lancaster. Improvements in power looms.

2754. Emanuel Barthélemy and Tony Petitjean, of Upper John-street, Fitzroy-square, Middlesex, mechanists, and Jean Pierre Bourquin, of Newman-street, Oxford-street, in the same county, merchant. Improved means of ornamenting glass.

Dated November 26, 1853.

2756. William Crofton Moat, of the Strand, Westminster, member of the Royal College of Surgeons, England. An improved truss.

2758. Georges Edouard Gazagnaire, of Marseilles, France. Improvements in the manufacture of nets for fishing and other purposes.

2760. Jules Roth and Henri Danner, of Mulhouse, France. An improvement in cards for carding.

2762. Louis Cornides, of Trafalgar-square, Charing-cross, Middlesex. Combining gelatine with certain other substances, and colouring the same, so as to produce various objects capable of resisting atmospheric influences.

2764. Joseph Scipion Rousselot, of Nimes, France, electrician. An improved application of magneto-electricity for driving machinery, and for neutralising the impulsive force of machinery in motion.

Dated November 28, 1853.

2766. William Pritchard, of Clerkenwell, Middlesex, cabinet-maker. Improvement in buffers for diminishing the shock in the collision of railway trains.

2768. Prix Charles Jean Baptiste Sochet, of Paris, France. Improvements in obtaining motive power by means of heated gases.

2774. Samuel Hurrell, of New North-street, Middlesex, smith. Improved machinery for measuring and winding or rolling fabrics.

Dated November 29, 1853.

2778. Auguste Edouard Loradoux Bellford, of Castle-street, London. Improvements in fire-arms. A communication.

2780. James Alexander Manning, of the Inner Temple, Middlesex, Esq. Improvements in the treatment of sewerage and other polluted liquids, and the products thereof.

PATENTS APPLIED FOR WITH COMPLETE SPECIFICATIONS.

2819. Charles William Hockaday, of Port Hall, Brighton, Sussex, gentleman. Certain chemical compound or compounds, applicable as a remedy or remedies for scorbutic and other affections of the human body. December 5.

2830. John Mold, of No. 6, Portland-terrace, Westmoreland-road, Walworth, Surrey. Improvement or addition to augment convenience by transformation and facility the different lines required in the erection or manufacturing edifices or structures by apparatus, tools, or instruments suitable for the different capacities of operatives and general surveying. December 6.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," December 9th*, 1853.)

1592. Richard Archibald Brooman. Certain machinery for converting caoutchouc into circular blocks or cylinders, and for manufacturing the same into sheets. A communication from François Perroncel, of Paris.

1679. Benjamin Looker, Junior. Improvements in the manufacture of bricks.

(*From the "London Gazette," December 13th*, 1853.)

1658. James Fletcher. Certain improvements in machinery used for spinning, doubling, and winding cotton, wool, flax, silk, and other fibrous materials.

1663. Thomas Hill Bakewell. Improvements in ventilating mines.

1699. Henry Lamplough. Improvements in the preparation and manufacture of certain effervescing beverages.

1706. Isaie Alexandre. Improvements in metallic pens and penholders.

1805. Antoine Joseph Quinche. An improved apparatus for measuring distances travelled over by vehicles.

1828. Joseph Lallemend. The manufacture of paper from peat.

1846. Richard Christy and John Knowles. Improvements in the manufacture of terry cloth or other woven fabrics having looped surfaces, and in the machinery or apparatus connected therewith.

1868. Samuel Hall. Improvements in furnaces.

1903. John Henry Johnson. Improvements in dyeing or colouring textile fabrics and materials, and in the machinery or apparatus connected therewith. A communication from Emile Weber, of Mulhouse, France, chemist.

1914. Edward Finch and Charles Lamport. Improvements in the masts and rigging of ships.

1977. William Austin. Improvements in the manufacture of blocks of plastic materials for building purposes.

2069. James Burrows. Certain improvements in the formation or construction of rolled metallic plates.

2436. Pierre Marie Fouque, Louis Réné Hébert, and Vincent Etienne Doret le Marneur. A fortune rudder in bronze.

2467. Weston Grimshaw. Improvements in steam boilers.

2512. Perceval Moses Parsons. Certain improvements in the switches and crossings of railways.

2627. William Austin. Improvements in the manufacture of casks.

2629. William Austin. Improvements in apparatus for trapping passages into sewers or drains.

2640. Michael Fitzgerald. An improved means or method of communicating between different parts of a railway train.

2643. Charles Emilius Blank. Improvements in winding yarn into hanks. A communication.

2644. John Liddell. An improvement or improvements in power-loom weaving.

2649. Peter Alexander Halkett. Improvements in apparatus for lifting and lowering ships and other heavy bodies, either submerged or otherwise.

2668. Charles Burton. Certain improvements in hand and draught carriages for common roads.

2687. Richard Stuart Norris An improvement or improvements in the manufacture of iron.

2691. William Austin. Improvements in the manufacture of tiles and tubes.

2698. Walter Henry Tucker and William Rashleigh Reeves. Improvements in locks.

2719. Benjamin Burleigh. Improved railway crossings, as adapted to the double-headed rail and the ordinary rail and chair.

2722. John Fielding Empson. Improvements in the manufacture of wire.

2729. John Drumgoole Brady. An improved mode of, or a new arrangement of, straps for slinging knapsacks.

2730. Thomas William Kinder. Improvements in the construction of the permanent way of railways.

2731. James Lovell. Improvements in the application of heat to various useful purposes.

2738. Elmer Townsend. New and useful improvements in machinery for sewing cloth or other material. A communication from William Butterfield.

2739. William Jones. Improvements in the manufacture of bricks.

2742. Davidson Nichol Improvements in the manufacture of envelopes.

2743. John Berry. Improvements in the machinery or apparatus for manufacturing wire fencing.

2745. William Leigh Brook and Charles Brook, jun. Certain improvements in preparing, dressing, finishing, and winding cotton and linen yarns or threads, and in the machinery or apparatus connected therewith.

2747. John Henry Johnson. Improvements in carding-engines for carding cotton and other fibrous materials. A communication from George Wellman.

2819. Charles William Hockaday. Certain chemical compound or compounds, applicable as a remedy or remedies for scorbutic and other affections of the human body.

2830. John Mold. Improvement or addition to augment convenience by transformation and facility the different lines required in the erection or manufacturing edifices or structures by apparatus, tools, or instruments suitable for the different capacities of operatives and general surveying.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed December 8, 1853.

1402. Frederick Ludewig, Hahn Danchell, and William Startin.

Sealed December 9, 1853.

1408. Antoine Pongon.
1410. William Muir.
1414. William Brookes.
1415. William Brookes.
1425. Christopher Binks.
1435. Robert Hopkins.
1501. Robert Midgley.
1503. William Boggett and George Brooks Pettit.
1911. Richard Archibald Brooman.

Sealed December 12, 1853.

1428. William Smith.
1429. John Marsh, Theophilus Marsh James Marsh, and Walter Marsh.
1457. Timoléon Zoé Louis Maurel.
1467. Peter Armand Lecomte de Fontainemoreau.
1468. Peter Armand Lecomte de Fontainemoreau.
1489. James Heginbottom and Joseph Heginbottom.
1502. Hiram Barker and Francis Holt.
1552. Robert Harlow.
1801. John Griffiths.
1836. William Newton.
1851. Thomas Young Hall.
1936. William Curtain.
1975. Charles Collyford Banks.
1993. Samuel Taylor.
2234. Hiram Berdan.
2254. John Wyncoll Baxter.
2258. William Henry Wilding.
2262. William Peace.
2322. James Knowles.
2341. Patrick Clark and Alexander Clark.
2348. Charles Scott Jackson.
2362. Thomas Grahame.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
Nov. 26	3535	J. Yates	Whitechapel	Blocking-machine.
Dec. 2	3536	J. Paterson	Wood-street	Balmoral tie.
3	3537	T. Barnes and W. Johnson	Lancaster	Bobbin.
7	3538	J. Lingard	Sheffield	Knife-handle.
8	3539	E. Reynolds	Derby	Link-motion.
9	3540	Dent, Allcroft, and Co.	Wood-street	Commercial purse.
10	3541	E. Green	Wakefield	Chimney-top.

NOTICES TO CORRESPONDENTS.

David Hope.—Our reply to the question, "Can there be friction without motion, and where there is only a tendency to motion, as in the case of a brick lying upon an inclined plane?" is, that friction undoubtedly exists under the circumstances mentioned. This will at once be seen upon referring to the definition of friction. In his "Elements of Mechanics," Snowball says—"Friction is the resistance which two material surfaces, kept in contact with each other by means of pressure, offer to the motion of one along the other." That such a resistance acts upon a brick lying upon an inclined plane, is evident from the consideration that there are but two other forces exerted upon the brick, namely, gravity and the reaction of the plane—the former of these acting at right angles to the plane, and therefore producing no motion, or tendency to motion, either up or down the plane; while the latter may be considered as composed of two forces—one of these being equal and opposite to the reaction of the plane, while the other tends to move the body down the plane, and would so move it were there not some counteracting force exerted. Since, then, it does not move, it is evident that such a counteracting force must exist, and is that occasioned by the roughness of the surface—that is, it is friction.

W. P. intimates, in very courteous terms, that we opposed the *physical* interests of Englishmen to the *spiritual* welfare of savages when we wrote the following passage, in our second Paper on Emigration:—"It is a strange fact (and one that can hardly be accounted for by recurring to the common vicissitudes of national life in civilized countries), that the religious people of Britain, *in general*, see more just now to interest them in heathens and savages than in their own unfortunate countrymen. They experience more delight in conducting schemes for proselytising the idolaters of India, and improving the barbarous islanders of Polynesia, than in ministering to the starving poor of the towns and cities of these lands." We confess that we wrote the above under the conviction that starving Englishmen have stronger and more peremptory claims upon us than contented savages. We might have gone further, and said that the former class have more urgent claims upon us than the well-fed portion of our own community. And in saying this, we do not lose sight of Christian obligations, but rather, we think, plead for their legitimate recognition. At any rate, it is quite certain that large classes of British philanthropists need to be reminded of the urgent claims of their indigent fellow-countrymen.

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1585.] SATURDAY, DECEMBER 24, 1853. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

BIRAM'S PATENT IMPROVEMENTS IN MINING.

Fig. 1.

BIRAM'S PATENT IMPROVEMENTS IN MINING.

(Patent dated June 4, 1853.)

Mr. Biram's improvements in working and ventilating mines consist, *Firstly*, In fixing the drums upon which flat ropes are wound over the pit for drawing up coals or minerals, and applying the power of two engines to cranks fixed at right angles to each other, upon the shaft of one of them, the other having also cranks at the end of the shaft similarly fixed, and the two being connected by coupling-bars, exactly in the way that four driving-wheels are connected in a locomotive engine. The engines may be fixed either vertically or horizontally, to suit circumstances, and coupled and worked by the link-motion and reversing gear on the locomotive plan.

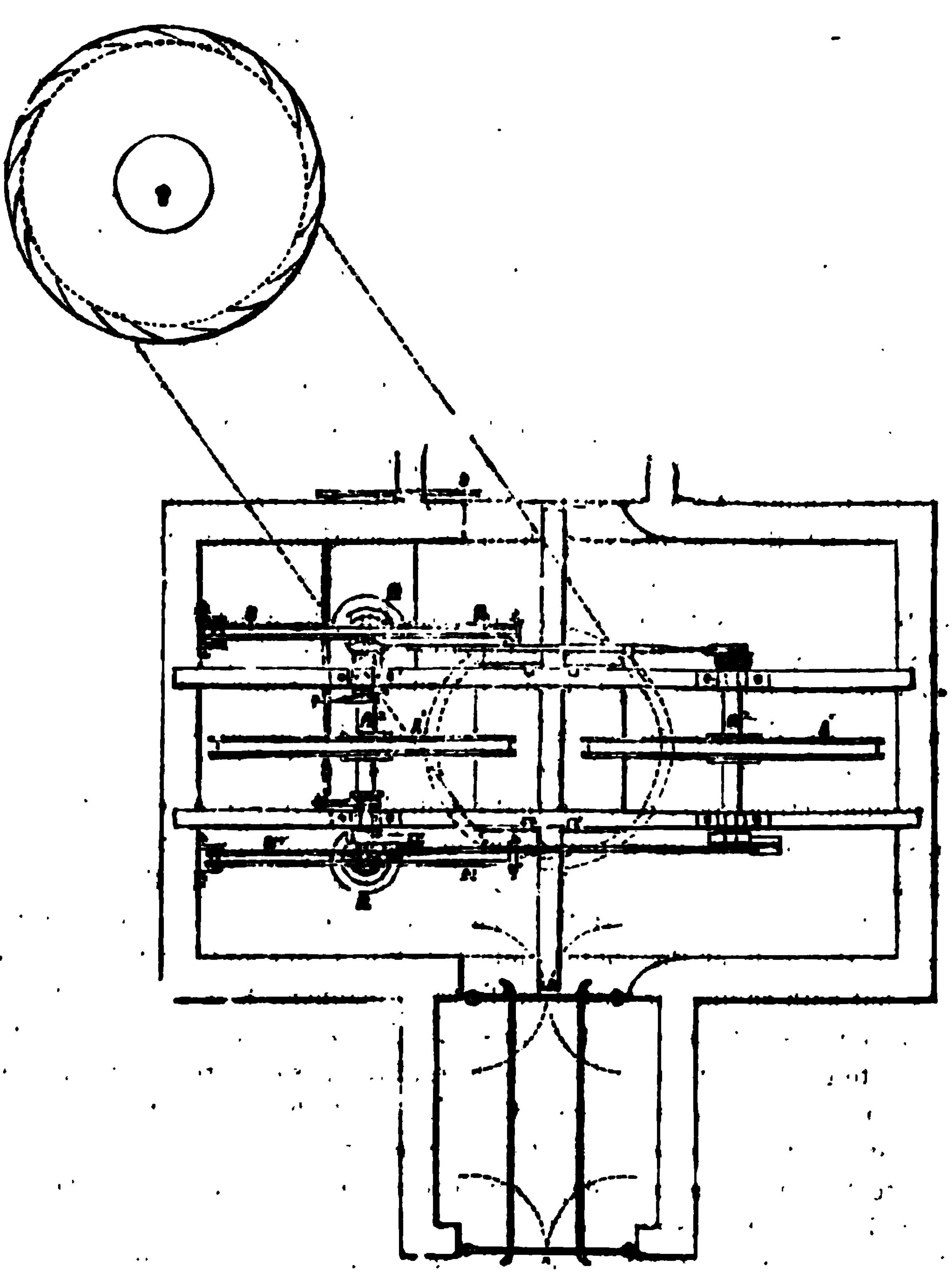
The advantage of this arrangement is, besides dispensing with a fly-wheel and extra pulley-wheels over the pit top, the facility which it gives of enclosing the whole of the machinery within a moderate-sized building, and making the communication with the pit's mouth by two doors, one only to be open at the same time, and thereby rendering a pit ventilated by a fan, or other machinery, available, both as an upcast and drawing-shaft. The engine man has also more control over his engine, and an earlier sight of the corves, by which the risk of raising them too high is diminished; for the momentum of the fly-wheel being removed, the corves may be instantly stopped upon arriving at the pit's mouth, and the distance between the pit's mouth and the pulley-wheels may safely be diminished.

Figure 1, of the engravings hereunto annexed, is a side elevation of a pair of engines, with their lifting drums arranged on this plan over the pit's mouth, showing also a part of the pit in section; and fig. 2 is a plan of the engines and drums. A A^1, are the drums, which are fixed on shafts, A^2 A^2, which are mounted and revolve in the bearings, A^3 A^3, attached to the framing, A^4 A^4, over the pit's mouth; B B are the cylinders of the pair of engines, and B^1 B^1, their piston-rods, which are respectively connected by the connecting-rods, B^2 B^2, to the cranks, C C, fixed at right angles to each other, upon the shaft of the drum, A; B^3 B^3, are links, and B^4 B^4, radius rods, forming a parallel motion, by which the piston-rods of the cylinders, B B, are respectively preserved in a perpendicular position during their upward and downward motions. The other drum, A^1, has also cranks, D D, at the ends of its shaft, fixed at right angles to each other, as before described with reference to the cranks, C C; and the two sets of cranks, C C, and D D, are coupled together by connecting-rods, E E, so that the drums, A A^1, revolve together in the same direction, so that the rope upon one drum descends while the other ascends. F F, are eccentrics for working the slide valves, G G, of the cylinders, B B, to which they are connected by the eccentric-rods, H H. The ends of each pair of eccentric-rods, H H, are jointed to the ends of the slotted link, I. Fig. 1, one only of these is seen in the engravings, but both engines are fitted in the same manner. K is a stud on the slide valve spindle, which takes into a slot of a link, I. L is a link, by which the slotted link, I, is connected to the end of the bell-crank lever, M, the short arm of which is again connected by a rod, N, to a reversing lever, O, centred at P, by means of which arrangements the engines are started, reversed, and stopped, when required. The parts just described are similar to the arrangements adopted in locomotive engines, and may be considerably varied, should circumstances require it.

Mr. Biram's improvements relate, *secondly*, to the ventilation of mines. The ventilator which he employs is driven by a separate engine; it is placed near the head of the shaft, and is a fan of the particular description hereafter given. The application of a fan for the ventilation of mines has now for some years been before the public, Mr. Brunton having described one before the Committee appointed by the House of Lords to inquire into the causes of accidents in mines; and Mr. Nasmyth having also erected one having five vanes, 1, 2, 3, 4, 5 (see fig. 3), each about half the depth of the radius, the air being admitted to the fan in the centre, and projected by its rapid revolution beyond the

periphery in a tangential direction on all sides. "As the efficiency of such a fan," says Mr. Biram in his specification, "must be mainly produced by the outer end of the vanes, it would appear desirable to diminish their depth from one half to one-tenth of the radius, and to increase their number to so many as that a tangent from the point, B, of one vane should just clear the outer end, C, of the adjoining vane. The assumed effect of this would be that, when the fan was in operation, the volume of air occupying the space A, B, C, D, would be projected beyond the periphery by each vane whilst the fan rotated from A to C. But this would be in a tangential direction, B C, as shown by the dotted lines, and which, as the resistance increases as the square of the velocity, would be the direction requiring the most power for the least effect. If the vanes, however, were fixed as at E B, instead of B A, so that the edge only of the vane would be presented to the wind, it is presumed the same quantity of air would be projected beyond the gyration of the fan in a given

Fig. 2

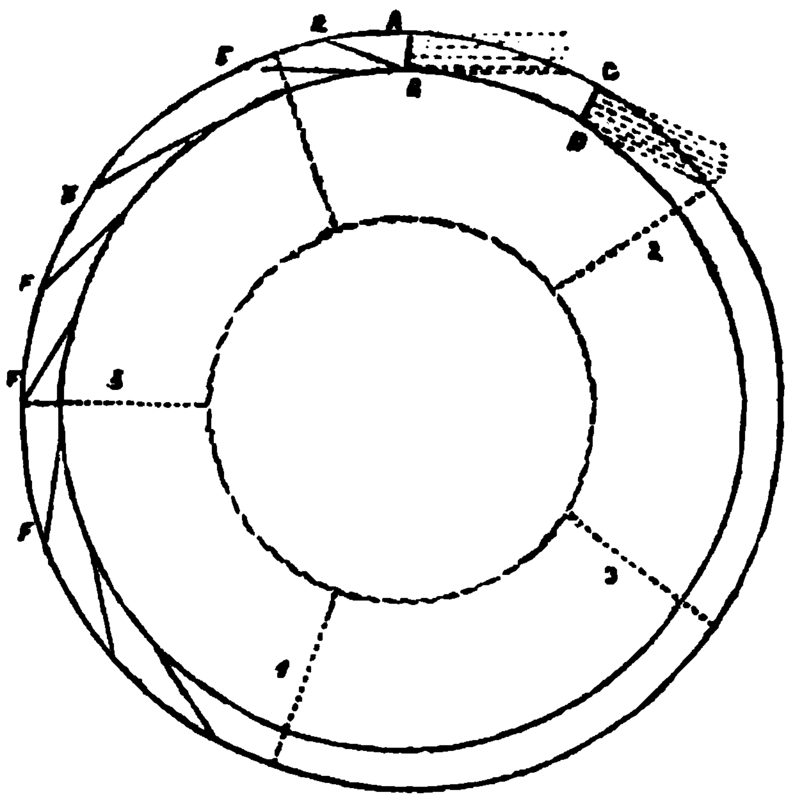


time, but in the direction B A, instead of B C. Suppose the length, A B, one foot, the distance B C would be 4·5 feet, and the resistance to the vane, A B, from the air would be $1 \times 4{\cdot}5^2 = 20{\cdot}25$ per square foot. But if B E were the vane, the resistance would be $4{\cdot}5 \times 1^2 = 4{\cdot}5$ ($BC \times AB^2$) so that a fan with tangential vanes, E B, might be driven at double the velocity, and pass more than double the quantity of air with the same power as a fan with the radial vanes, A B. I propose, therefore, to employ for the ventilation of mines, fans having blades placed tangentially, as at EB, or at an intermediate angle between

B B 2

E B and A B, as at F B. Figs. 1 and 2 show the position, with respect to the pit and lifting-engines, in which I place my ventilators. The fan is closed in at top, and the spindle is

Fig. 3.



furnished with a crank, by which it may be driven from a separate small engine placed in any convenient position for that purpose."

INSTITUTION OF CIVIL ENGINEERS.

Sitting of December 6th, 1853.

The Paper read was, "On the Drainage of the District South of the Thames," by Mr. J. T. Harrison, M. Inst. C.E.

The district south of the Thames, comprised in the "Surrey and Kent division of the sewerage of the Metropolis," was briefly described as extending between Battersea and Greenwich, over an area of upwards of 9 miles in length, with widths varying from ¼ mile to 2¼ miles, bounded by the river Thames, on the north, east, and west sides, and by the rising ground on the south. Its chief peculiarities were, that the surface was almost entirely below the level of high-water mark,—that it was, to a considerable extent, formed of alluvial deposit, permeable to, and surcharged with water, and it was, moreover, subject to frequent flooding from the adjoining high land.

For such a district, the points demanding attention, were shown to be;—thorough drainage of land,—means of preventing the inflow of water from the neighbouring high land—the rapid discharge of the rain-water falling on the area,—and the regular conveyance away of the sewage matter, not only from the houses, but from the main sewers.

The present system of drainage was shown to be very defective; but the author expressed his conviction of the possibility of remedying the existing defects, and of taking advantage of the assistance of the rise and fall of the tide, and of other local circumstances, for thoroughly effecting, both the cleansing of the sewers and the drainage of the district, by means, inexpensive in themselves, and independent of the casualties of steam pumping machinery, or of the caprice of ratepayers.

It was shown, that the existing sewers acted partly as drains for the land water, but they only extended over a portion of the area; whilst from their being so frequently full, and even being under pressure, the sewage matter escaped from them and saturated the ground; it was therefore contended, that a system similar to ordinary agricultural drainage should be carried out. The question was incidentally raised for discussion, whether advantage might not be taken of the known rapid filtration of the chalk formation to facilitate this operation, by sinking several wells, into which the land drains might converge.

The interception of the up-land water, by catch-water drains, was insisted on, and the necessity for it pointed out.

The rain-water was proposed to be conveyed away by the existing sewers, which would require some addition.

The conveyance of the sewage matter from the houses of the district was next discussed. This was divided into stages,—the first, from the houses to the public streets; and the second, from the streets

to its destination. The means of obtaining the first point were simple; and the stone ware pipes were recommended, as sufficiently good, if of large diameter, and laid properly on a system of separate, rather than of combined drainage. For the second point, Greenwich Marshes being fixed upon for the temporary reservoirs, or recipients of the sewage matter, and the Thames as the ultimate distributor of it, it was proposed to take advantage of the fall of the Thames between Battersea and the Greenwich Marshes, which was stated to be 3 feet at the lowest neaps, 5 feet 6 inches as a mean, and 7 feet 6 inches at the highest spring tides, and by a copious use of Thames water to flush out the main sewer daily.

This could be accomplished, by forming a main sewer 8 feet in diameter, from Battersea to Greenwich Marsh, having the same fall as the Thames at low water neap-tides; its invert being 1 foot below low-water, and having a communication with the Thames at each end, so that water from the river might flow through at low-water; forming, also, reservoirs for arresting and collecting the sewage, and a canal for receiving the liquid after the filtration, or precipitation of the solid matter;—this canal, excavated 6 feet below low-water spring tides, extending across the marsh and being connected with the Thames, at each end, with proper gates, etc., so that water from the river might flow through it towards and at low-water, leaving it full of pure water, when the gates were shut, on the rising of the tide. The overflow, from the reservoir into the canal, might be 2 feet above the highest low-water mark, so as under the most unfavourable circumstances to give that depth for the filtered sewage water and that used for flushing, to accumulate during high-water. It was contended, that by having the mouths of all the cross sewers, communicating with this main duct, fitted with flaps, the head of water derived from the Thames, which would be 15 feet, at springs, and 10 feet 8 inches, at neap-tides, would give a velocity, through the main sewer, of about 2 feet 6 inches and 2 feet per second respectively, which would be sufficient to clear away any deposit. This canal might also be used for loading barges to carry away the sewage, either for agricultural purposes, or for discharging lower down the river, or out at sea.

It was further proposed to form cross drains at convenient distances apart, from the Thames to the main sewer, which should be flushed by a head of water from the river at high-water, all the collateral drains into these, being fitted with flaps. These, it was contended, might be kept nearly level, the head of water being abundant for thoroughly flushing them.

The collateral drains being constructed with a good fall and communicating, at each end, with the cross drains, could be thoroughly flushed at stated periods.

The question of the applicability of the existing sewers was then examined, and from data afforded by Captain Vetch's sections, it was considered that they might be made available; the large proportion of 41 miles of open ditches (in 1848) to 30 miles of closed sewers, was urged as a strong argument for the introduction of an entirely new system.

It was urged, that the chief point to aim at, was the adoption, if possible, of a system that would work well without any mechanical pumping, as steam power could be added, if found necessary, for discharging the sewage matter into the Thames at high-water.

Comparisons were drawn between Captain Vetch's plan, and that now proposed to be carried out by the Commissioners of Sewers. It was urged, that Captain Vetch's "long covered tank, reaching far into the district to be drained," retained some of the most objectionable features of the present system, and that the Commissioners' plan of flushing from the Thames, being dependant for its success on the steam engine pumping out the water, as fast as it was let in from the Thames, was undesirable, and liable to be entirely frustrated by accident.

An appendix contained some communications made by the author, in August, 1849, to the Metropolitan Commissioners of Sewers, in answer to their appeal to the public for suggestions on the subject of the sewerage of London. In those documents, a system of drainage was proposed, the chief point of which was the making use of the head of water afforded by the rise of the tide in the Thames, for a general system of flushing the whole of the sewers of the low-lying districts, and in many respects similar to the system described in the paper.

Sitting of December 13, 1853.

The discussion was resumed on Mr. Harrison's paper, "On the Drainage of the District South of the Thames," and was continued throughout the evening.

The best systems proposed were stated to be, the interception of the highland waters, the carrying away, by gravitation, all the contents of the sewers which could be discharged into a low point of the Thames by natural means, and resorting to pumping, only for such portions of the Metropolis as were too low for any other system. Such, it was contended, was the plan which had

been proposed by Mr. J. R. M'Clean to the Commissioners of Sewers, in 1849; and in a review of the systems proposed by Captain Vetch, the late Mr. Foster, and Mr. Bazalgette, the accordance with and deviations from the original plan were pointed out and commented on.

The necessity for providing against any chance of flooding the basements of the houses, by allowing the main sewers to become filled and be under pressure, was insisted on. Doubts were expressed as to the possibility of obtaining sufficient velocity to scour out such main sewers, as those proposed to be flushed from the Thames, and having their outlet at Greenwich.

The question of pipe drains and brick sewers was again entered upon, and it appeared, that experience confirmed the previous impressions, of the applicability of the pipes to house drainage only, when they had rapid fall and were of sufficient area; but that nothing could be relied upon for street sewers, except brick constructions, sufficiently large to permit access within them; they should also be permeable, so as to act as drains in conveying away the land water from the district which they traversed. It was stated, that in Lambeth, there were spots, which about twenty-five years since were full of water, but which at present, during the summer, were found to have been thoroughly dried by the action of the sewers passing through, or near them.

It was urged, that the question of the proper outlet for the sewerage, could only be fixed by careful investigation of the period during which the matter remained suspended, and the distances it travelled up and down the river with the ebbing and flowing tides; the experiments already made on this point did not appear to be received as authority.

In treating the questions of detail, it was shown, that the brick sewers, never, practically, became elongated cesspools, as had been asserted; that there was really greater scouring power in an egg-shaped sewer, than in a pipe drain; that the alleged smooth interior of the pipes was illusory, as their joints were more liable to occasion stoppages, than the joints of the brickwork; that the interior of the latter did, practically, soon become covered with a slimy matter, which aided the flow; and that deposits rarely occurred, except where the sewers were too flat and too small.

The discussion occupied so much time, without any definite point being arrived at, that it was decided to adjourn the further consideration of the question until the evening of Tuesday, January 10th, 1854.

MATHEMATICAL PERIODICALS.

The Northumbrian Mirror.

BY T. T. WILKINSON, F. R. A. S.

Origin.—The first number of this interesting and valuable serial was published in January, 1837, under the title of "The Northumbrian Mirror; or, Young Student's Literary and Mathematical Companion, forming an Introduction to the *Ladies' Diary*, &c." In the opening address, the Editor states that the motives that led to the publication were simply the "great and acknowledged want of a medium through which the younger and less experienced mathematician might aspire after scientific renown; and to supply him at regular intervals with fresh and agreeably diversified subjects both of practical utility and of theoretical interest. The *Mathematical Companion* and the *Ladies' and Gentleman's Diaries* are instanced as having "been eminently successful in raising the tone of mathematical feeling, and creating a more extensive study of the science;" but these works being chiefly fitted for adepts, a work of similar character "adapted to the progress and acquirements of less advanced students had long been a desideratum which the present work would endeavour to supply." The *Mirror*, however, was not destined for a long continuance. Like most works of this class it flourished for a brief period, and was well supported by a numerous class of able contributors; but a change of one editor, and the removal of another, led to its discontinuance with the fifteenth number in July, 1841.

Editors.—The first thirteen numbers of the work were edited by the Rev. W. Telfer, M.A., of Alnwick; and the two last, forming a new series, by Stephen Fenwick, F.R.A.S., now one of the mathematical masters of the Royal Military Academy, Woolwich.

Contents.—The usual contents of each number are Essays on miscellaneous subjects, Poetical Sketches, Classical, Mathematical, and Philosophical Queries, Enigmas, Rebusses and Charades, Mathematical Essays, Solutions, together with New Questions, &c., proposed for solution in the next number. Many of the Essays are exceedingly well written, and the poetical musings are in general much superior to those usually found in works of this nature. Several of the answers to the earlier classical queries are furnished by Mr. Oxenford, of London, and do equal credit to his taste and judgment. Towards the close of the work, the Editor allotted a small portion of his space for the accommodation of *petit* novels; but it does not appear that many of his correspondents were *au fait* in the

art of weaving the web of fiction. The mathematical papers possess a high degree of merit, and many of them relate to subjects of vital importance to all mathematical students. We only need to mention the names of Rutherford, Fenwick, and Tate, to satisfy the reader that he will here find a series of discussions which will amply repay an attentive perusal. Among the more lengthy papers, we may select the following for more especial notice:—

1. Observations on the Study of Mathematics. By W. Telfer, M.A.

2. On Classical Studies. By F(erguson?) Alnwick.

3. On the Pleasures of Solitude. By William Harrison, Felton New School.

4. Particular Prejudices. By M. S. Morpeth.

5. Gymnastic Amusements. By Athletes.

6. Scenes in Northumberland. By C. Hexham.

7. On Attention with regard to Education. By T. Rea.

8. Cursory Remarks on the Style of Johnson. By Arundo.

9. On Botany, and the Formation of a Herbarium.

10. Tales of Northumberland. By T. Alnwick.

11. Domestic Condition of the Northumberland Peasantry. By Agricola, Coquetdale.

12. The Indian Mother. By Edwin.

13. The Forester's Daughter. By H. Vernon, Alnwick.

In the New Series we have,

Art. 1. Physical Facts and Elucidations.

Art. 2. An Introduction to Mineralogy and Geology. By J. L. T.

Art. 3. Captain Warham's Discovery of a Large Bay on the West Coast of Davis's Straits.

Art. 8. On the Undulatory Theory of Light.

Art. 9. Scientific Observations. By M. Arago.

Art. 10. Funeral Oration pronounced at the Interment of Poisson.

Art. 11. A Sketch of the Life of Olinthus Gregory, LL.D., of the Royal Military Academy, Woolwich. By J. W. Elliott, Greatham.

Many of the answers to the Queries are worthy of more particular mention did space permit; but on the present occasion we must content ourselves with a general commendation. Almost every page gives evidence that there is still an abundance of sterling talent in the North of England.

(*To be continued.*)

LOCOMOTION ON THE SURFACE OF THE WATER.

FROM A CORRESPONDENT, N. B.

Sir,—Your readers will have seen some of the frequent attempts that have been made in the last few years to increase the speed of ships, by making the resistance of the water to vary inversely as the speed. The experiments have been confined to paper, and the calculated results are so tempting that we are likely to have a continuance of these supposed inventions, until some one is hardy enough to try and demonstrate them practically. I have stumbled upon one of this genus, lately published in *La Presse*, which I think particularly queer; and for the benefit of those of your readers who are not able to read the original, I send, not a translation of the articles—they are too long for that—but just a sketch of the method.

Its author is "M. Planavergue, Professeur de Mathématiques au lycée de Cahors;" who is introduced to our notice with a great flourish of trumpets. "He wishes to effect," says *La Presse*, "such a revolution in ships as was effected in locomotion upon land, when some genius, probably unknown, displaced the sledge by a car mounted on wheels." "Our vessels plough through the water, and thrust it out of their course; he imagines them to roll upon the surface." He constructs what he calls hydro-locomotives, which, either alone or dragging a train of carriages, skim over the seas, the rivers, the canals, at the rate of 80, 90, 120 miles an hour: "they outrun the tempest." "The constituent parts of the vessel are three in number—a case corresponding to the body of a coach, four great floating cylinders to the wheels of it, and a motive power in the interior of the case." "This case is light, has two floors, and rests upon a strong frame, to which it is firmly secured. The bottom compartment contains the motive power and the provision; the upper the travellers and the luggage." In the first article given by *La Presse*, the supporting cylinders are supposed to be hollow and perfectly water-tight, but in a supplementary account the inventor proposes to leave the ends of the cylinders unclosed, allowing a free passage of water to their interior; this modification does not affect the principle, as will be seen. Annular plates of iron embrace the cylinder at short intervals, from end to end, and the spaces between them are subdivided by longitudinal plates, so that the whole surface of the cylinder is covered with open cells, and "when under the action of the motive power the cylinders turn; the cells (reversed) are plunged into the water; now the cells are partially filled

with air, so that the water is separated from the immersed surface of the cylinders, which, instead of resting directly upon the water, are carried on a mattress of compressed air; the advantage of this is immense." After examining the stability of the proposed vessel, adopting means for diminishing the resistance of the air, and determining how the vessel shall be steered, the writer proceeds: ordinarily "the resistance to vessels varies very nearly as the square of the velocity; we can only make 12 or 15 miles per hour, with a great expenditure of labour. In the system of M. Planavergue, on the contrary, the resistance of the water diminishes very rapidly as the velocity is augmented and tends to become zero. In fact, the water beneath the cylinders re-acting against the air compressed in the cells, with an intensity nearly proportional to the square of the velocity, the locomotive will rapidly lift itself as the velocity increases, and it will tend to fly over the surface of the water as a bullet or stone (*qui ricoche*)." An example is then given in which the whole weight of the vessel and equipment is 80 tons; draught of water, at rest, nearly a foot, and diameter of cylinders 16 feet.

"The locomotive starting with an increasing velocity, the resistance of the water will go on diminishing, the velocity increasing in proportion; the resistance of the air will, however, be augmented until the motive power is exhausted by the friction and the resistance of the water and of the air. At the moment when the velocity becomes constant, the locomotive will be going at the rate of more than 60 miles an hour." After showing how easy "Fuir devant la tempête" and "Tourner la tempête" will be, he adds: "the mattress of air on which it is supported will give to its movements the easiness of those of a balloon." "The hydro-locomotive will go over sand-banks, or on the land, as easily as on the water;" and a velocity of 120 miles per hour is shown to be easily attainable. M. Planavergue says, in conclusion, "The advantages of the system appear to me to be so great, that I find myself, with regard to navigation, in the state of a man from whose eyes a thick bandage has just been removed. The system hitherto pursued seems most barbarous. Instead of the steam-boats which ascend the Rhine so slowly and so painfully, wasting an immense amount of labour in disturbing the water, driving away the fish, and destroying the banks, I see the hydro-locomotives scarcely ruffling the surface as they pass over it with a motion as rapid as the flight of a swallow; I see distance nearly annihilated; the relations of strange people become the relations of neighbours; commercial transactions developing themselves in an extraordinary degree; industry increasing in proportion, and homeless, houseless wanderers peopling the deserts of the earth. I see, at the last, human activity attaining colossal proportions, and labour producing inexhaustible riches."

I think I have given all that the writer has thought necessary for explaining the principle by which these extraordinary results are to be obtained, and I need hardly say that I am not at all convinced by his arguments. It is difficult, in the first place, to see what he hopes to gain by the air-cells; yet it is only this which distinguishes the invention from the numerous other attempts that have been made to substitute the friction of rolling for that of sliding, by causing the vessels to be supported on closed cylinders, which acquiring great velocity, are at last made to roll on the surface of the water; yet great importance seems to be attached to the mattress of compressed air, on which the vessel is said to rest. This much is perfectly clear, that when the vessel is at rest, there can be no air in the cells below the water-level; and if the vessel weighs 80 tons, 2,800 cubic feet of it must be immersed, no part of which can be obtained from the cylinders, which, so far as support is concerned, are therefore absolutely useless. Nor does it seem at all likely that, with the great immersion they must necessarily have, any portion of air could be carried beneath the water at any velocity which it is possible to give to the cylinders; but were the cells filled with air, they would not do so much towards supporting the weight of the vessel, as if the cylinder were completed without them; for it evidently requires a greater pressure to force an empty glass beneath the water when the bottom is downwards than when it is reversed, as the cells are, because of the compressibility of air. Should the vessel acquire the rapid velocity which he predicts, the cylinder and cells would be under the same conditions as a common cylinder with a diameter somewhat less than that of the one in question; the only important difference would be that the friction between the rolling surface and the water would be considerably less in M. Planavergue's case than in the other; but this is by no means an improvement. The greater the amount of friction the better for the success of the invention, for the more nearly will it approach the conditions of a railway. So far as I can see, the invention in question is no improvement on the use of simple cylinders; and the only question left is, can a vessel be so constructed as to receive a resistance from the water varying inversely

with the velocity? It seems to me that the effect of the cylinders would be the same as that of inclined planes pushed through the water at a high velocity, for the revolution of the cylinders continually presents the same amount of surface to the water in front, at an angle depending on their immersion and diameter; so that the forces on which the inventor depends would really be present, but I fear the cylinders would never roll upon the surface; for in that case the conditions would be completely altered; there would no longer be an inclined plane opposing the water in front, the angle would have vanished, and the cylinders would have no velocity with regard to the water—clearly no more than the wheels of a locomotive carriage, with regard to the rails on which it runs; and if there is no velocity with regard to the water, there can be no supporting force: in other words, it could not be made to rise beyond a certain limit, which is, I fear, very close to that in which the displacement is equal to the weight of the body. But how close it is, experiment alone can determine.

(*To be continued.*)

A ROTARY ENGINE.

To the Editor of the Mechanics' Magazine.

Sir,—As it appears to many persons a desideratum that a good rotary steam-engine should be produced, and as no method of constructing one has yet come into extensive operation, I am desirous to know whether the principle of the "water gas-meter" has been fully tried, the steam being made to pass into a drum or cylinder revolving in mercury.

With this idea in view (about four years since), I constructed a model, of the form shown in the accompanying sketch. The drum, *a*, is of metal, divided into eight compartments, *b b*, &c., each compartment having an opening near the axis for the admission of the propelling elastic fluid, and another aperture, for the escape thereof, at the outer edge of the cylinder. This drum revolves upon a fixed hollow shaft, through which the elastic fluid passes, and enters by an aperture made on the upper surface of the shaft, into each separate compartment, as the openings are severally brought over the aperture in the shaft. It will be seen, by this arrangement, that the elastic fluid can enter into each compartment only when the aperture for escape is at the lowest point, and consequently where the fluid, in which the drum revolves, offers the greatest resistance; and this, supposing the drum to be 6 feet in diameter, and completely immersed in mercury, would offer a resistance of about 40 lbs. per square inch. My model is made to revolve in water, and I have used com-

pressed air, and also gas, and find (considering the rudeness of the construction) that a very good rotary movement is produced, the front of the outer case being of glass, so that I can observe the action.

I am, Sir, yours, &c.,

Edward Cocks.

Southampton.

AERIAL TRAVELLING.

To the Editor of the Mechanics' Magazine.

Sir,—I had hoped that ere this some one else would have come forward on this momentous question, as the unsupported opinions of a nameless being like myself must cut but a sorry figure, opposed to those of Mr. Wm. Baddeley; but as it is not the first time that such as I have figured in the same way in your pages, I will, with your permission, venture another flight. We all know that a balloon would never rise from the earth, were it not lighter than the air which it displaces, and that it continues to rise until such displacement, and the weight of the balloon and all its appendages, are equal, where it becomes, as it were, part and parcel of the atmosphere in which it floats, and consequently must be governed entirely by all its motions; and as resistance to this motion increases with the velocity of the wind, it is desirable to keep everything as small as possible, for every foot of surface exposed to the wind will be acted upon with equal force, and will consequently increase the power required.

Now, I think little has been said or thought as to the best form of propeller; I

would, therefore, advise the embryo company, or any one inclined to experiment on the subject, to commence operations, by all means, on *terra firma*, as it will not only be much safer, but more economical, and may easily be effected by procuring the loan of a locomotive engine, together with a good siding or short length of railway to act upon; then, disconnecting the engine from the driving-wheels, and applying its power to a propeller acting on the air alone, to give motion to the carriage and tender; and when a satisfactory speed has been obtained in this way, it will then be quite time enough to think about soaring aloft.

I am, Sir, yours, &c.,

T. V.

ON THE TONNAGE OF ANCIENT SHIPS.

To the Editor of the Mechanics' Magazine.

Sir,—It is the usual practice to measure the tonnage of the "great ship" built for Ptolemy Philopater by the rules employed for vessels of the form of English merchants' ships. The propriety of the application of this rule to a vessel whose form, there can be little doubt, was that of a fast Mediterranean galley, may be questioned.

If the displacement is calculated from a form of this character, 2,000 tons measurement will be found to be a closer approximation. In the first place, the long projection of the bow must be deducted from the extreme length, leaving 370 feet to 390 feet, between the perpendiculars. The top sides of such a galley would flare out from 5 feet to 6 feet beyond the breadth of the water, so that the actual water-line breadth would be from 42 feet to 45 feet only, instead of 56 feet, while the depth would not exceed 12 feet or 15 feet, or one-third of the water-line breadth; and hence 2,000 tons would be a large allowance of displacement, as the ends would be probably fine in a rowing-vessel.

The total crew is stated to have been 7,220 men, which, at 14 men to the ton, would indicate a burden of 515 tons.

The cargo of corn mentioned sounds well at 60,000 measures. The modices, a usual Roman measure, equal the English peck; hence we should have 15,000 bushels of wheat at 60 lbs. the bushel, equal to 400 tons.

A ship of this size would justify all the accounts found in ancient writers, and coincide more closely with that which might be expected, from our knowledge of ancient ship-building.

I remain, Sir, yours, &c.,

N. S.

December 15, 1853.

SIGNALIZING EXPERIMENTS.

Captain Norton has lately been experimenting with his rifle signal-whistle, firing it from his rifle cannon, of two inches bore, over a range of 1000 yards, and on one occasion to the distance of 1,250 yards; and so accurate was the flight of the shot, that it did not deflect 2 feet from the line of aim. The weight of the shot, with its wooden sabot, was 1¼lbs.; it was cast of plumber's solder, as recommended by the inventor, in 1832. We are informed that Captain Norton expects to throw his rifle-shot, rifle percussion-shell, and rifle spinster, from this small rifle cannon, accurately to the distance of 2,000 yards, and is sanguine in the hope that whistles on this construction will be usefully employed for making signals in the Arctic Seas, when fired from 32-pounder rifled cannon, and that at least one-fourth additional range will be thus gained over the range of cannon not rifled.

The sound of the whistling rifle-shot resembles the sound of a boy's humming top or of an æolian harp. This proceeds from the form of the hole in the shot, and from the *spin* on its long axis imparted to the shot by passing through the spiral grooves of the rifle-cannon. It is announced that the inventor will immediately proceed to demonstrate practically his railway signals of distress, by throwing perpendicularly into the air, to the height of 60 feet or more, a pasteboard case or shell, containing one or more pounds of gunpowder to be exploded high in air by means of a line of the required length attached to it at one end by means of his frictional cork, or frictional cord, the other end of the line being secured to the wrist or waist of the person who throws the shell. When the shell reaches the length of the line, the sudden pull on the frictional appliance explodes it, and the flash from this mimic thunder and lightning is seen far and wide. The shell may be advantageously charged with the composition that produces the *white* light, the best for seeing in thick or hazy weather. A sling made of a long slender ash handle, such as is used for throwing up sheaves of corn in rick making, will throw this shell or greuade to a considerable height.

Captain Norton also produces *four* different and distinct sounds by means of shooting his short arrows from a steel cross-bow, or from a revolver of the musket-bore size, to be discharged by the guard of a train against a Chinese gong hung behind, and over the head of the engine driver. The four sounds may be distinct words of command—such as, bring up, go on, go fast, go slow. Other sounds could be produced, but the above four are sufficient for all pur-

poses, and more might lead to confusion. These sounds of command act like the sounds of a bugle in battle, where, from the noise of the artillery and musketry, no other sound can be distinguished.

NOTICE TO SUBSCRIBERS.

In consequence of the descriptions of patented inventions occupying so large a portion of our Magazine since we commenced to publish abstracts of the whole of the specifications filed, it is our intention to increase our space by four pages, after the close of the present year. We also purpose publishing, after that time, abstracts of all the Provisional Specifications of Inventions subsequently abandoned, so that the Mechanics' Magazine will contain the substance of every invention that is thereafter made the subject of protection. We shall thus supply a complete digest of all the current information that is indispensable to intending patentees, and is also of extraordinary interest to all who are concerned in the progress of the arts and manufactures of this country. We shall also announce all applications for prolongations or extensions of the terms of Letters Patent.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

James Mayelston, of Elloughton, York, gentleman. *Certain improvements in the manufacture and refining of sugar.* Patent dated June 3, 1853. (No. 1364.)

Claims.—1. The employing of atmospheric pressure, induced by exhaustion or suction, in vessels with false bottoms, or in moulding apparatus combined or used therewith, for the purpose of facilitating the draining of the mother syrup from crystals of sugar, and also for the purpose, when desired, of subsequently washing or liquoring the said crystals in such vessels or moulding apparatus.

2. The suspending of pneumatic draining and cleansing apparatus in such manner as to admit of its being readily inverted to facilitate the discharging or unloading the same.

3. The means described of retaining saccharine fluids between given degrees of temperature.

4. The moulding, draining, and cleansing of sugar, by the aid of pneumatic pressure, in hexagonal moulds, so united or placed together in one common vessel as to admit of the sugar in them being drained or washed in common.

James Spotswood Wilson, of Tavistock-place, Russell-square, Middlesex, civil engineer. *A machine or apparatus for digging or raising earth, and applicable to agricultural or engineering purposes.* Patent dated June 3, 1853. (No. 1365.)

Claims.—1. The placing of picks or prongs on wheels or cylinders; the said picks or prongs being curved in a manner to correspond with a segment of the cycloidal curve, the radius of the circle in which they work being determined by the distance between the axle and the surface of the ground when the machine has been let down to work.

2. The form and application of the mouldboard in the manner represented, or in any other equivalent manner.

3. The use of the revolving cutters, or colters, in combination with the other parts.

Isaiah Kendrick, foreman to Messrs. Horton and Son, of Southwark, Surrey. *Improvements in steam boilers.* Patent dated June 3, 1853. (No. 1366.)

A part of this invention was described at length in our last number, and the remainder will be hereafter given in a separate article.

Thomas Barnabas Daft, of Lezayre Lodge, Isle of Man. *Improvements in inkstands.* Patent dated June 3, 1853. (No. 1367.)

This invention consists in combining with an ink-vessel or holder, a tube, with a dipping-cup at its upper end, there being a collar or stopper formed on the tube, which fits into an opening at the top of the ink-vessel. The tube descends from above into, and nearly to the bottom of, the ink-vessel, through the opening; and by the compression of the air therein, the ink is forced into the dipping-cup; and when this cup is raised, the ink descends into the vessel. The opening through which the tube passes is lined or formed with vulcanized India-rubber. The inventor claims the above-described combination of parts.

James Hayes, of Elton, Huntingdon, ironfounder. *Improved machinery for raising and stacking straw, hay, corn, and other agricultural produce.* Patent dated June 3, 1853. (No. 1369.)

The inventor describes and claims apparatus composed of a travelling endless strap, which carries a series of plates placed at right angles to its surface, and which travels over suitable rollers, fixed in a light frame, which is capable of being elevated as the height of the stack increases. The strap is driven by a handle or handles, or in any other suitable manner. When the apparatus is in use, the hay or other substance is placed on each plate as it passes upwards, and being carried up by the plate to the top of the frame, is thrown upon the stack, as the strap carrying the blade passes round

the upper roller in order to descend down the back of the frame.

William Edward Maude, of Liverpool, Lancaster, merchant. *Improvements in carriages.* (A communication.) Patent dated June 3, 1853. (No. 1370.)

Claim.—Forming a concealed chamber in the axle-box, with one or more perforations for the purpose of supplying the axle with oil. And also the combination of certain inner and outer shoulders or bearings, and the combination of a certain cap with the two half collars, for confining the box to the axle, closing the end of the box, and uniting the several parts together.

William Edward Maude, of Liverpool, Lancaster, merchant. *Improved apparatus for steering ships.* (A communication.) Patent dated June 3, 1853. (No. 1371.)

Claim.—The general arrangement of apparatus described, and particularly the combination of the forked and unforked pawls, with a single ratchet, and with surfaces placed face to face, and on the same side of the wheel. Also applying springs to the pawls, in combination with arms and a cap; and the arrangement and combination of the sweep-chains and blocks, as described.

Joseph Gyde, of Tooley-street, Southwark, Surrey, millwright and engineer. *Improvements in mills and apparatus for grinding and dressing corn and various substances.* Patent dated June 4, 1853. (No. 1374.)

Claim.—The use of mill-stones face to face, in a vertical position, or nearly so; and the use of the dresser in a horizontal position, or nearly so, whether for portable or other mills; and also the combination of the several parts of the mill, as described.

John Chisholm, of Holloway, Middlesex, practical chemist. *Improvements in the production or manufacture of artificial manures.* Patent dated June 4, 1853. (No. 1375.)

This invention consists in treating animal bodies so as to destroy their organic structure, and in arresting and securing the gases evolved in such operation; and also in treating certain vegetable substances by a similar method; or the animal and vegetable bodies are mixed together previous to their being acted upon. The inventor also makes use of certain mineral substances for perfecting his operation.

John James Kerr, lieutenant, R.N., of Gloucester-grove West, Old Brompton. *Improvements in the manufacture of cartridges.* Patent dated June 4, 1853. (No. 1376.)

This invention consists in forming cylindrical cases of tin, made without seam, and coated with fibre or flock, for receiving powder, shot, or shell.

Henry John Betjemann, of New Oxford-street, Middlesex. *Improvements in chairs.* Patent dated June 4, 1853. (No. 1377.)

This invention consists in combining suitable parts so as to produce a chair having the combined capabilities of reclining, rocking, and revolving. The arms are hinged to the back, and slide on the side-rails of the seat; and the position of the back is regulated by stops or catches, which retain it at any desired inclination. The chair is carried by a separate frame, on legs or supports, and an intermediate frame is employed which turns on a central axis, so as to obtain rotation to the seat when desired; and a stop or stops are used to prevent rotation when wished. The seat is connected with the intermediate frame by four springs, one at each side, and one at the front and back. The rocking of the chair may also, when desired, be prevented by a stop or stops.

The inventor claims the combination of parts described.

Edward Blackett Beaumont, of Wood Hall, Barnsley, York, gentleman. *Certain improvements in bricks or tiles.* Patent dated June 4, 1853. (No. 1378.)

Claim.—Bricks having indentations, holes, or hollows in one or both of the beds or broad sides, as described.

Joseph Burch, of Craig-hall, near Macclesfield, Chester, carpet-manufacturer. *Certain improvements in fans, blasts, or blowing-apparatus.* Patent dated June 4, 1853. (No. 1379.)

The inventor arranges his apparatus so that when a shaft is revolved, those parts of the blades of the fan nearest the axis will cause a centrifugal action on the air, producing a partial vacuum, which is fed by the natural weight of the atmosphere; and those parts of the vanes or blades furthest from the shaft act to force forward an air-tight casing in which the air is thus condensed.

William Dray, of the firm of William Dray and Co., of Swan-lane, London-bridge, agricultural-implement makers. *An improved method of driving shafting.* Patent dated June 4, 1853. (No. 1380.)

Claim.—The driving of shafting by means of an endless band kept in a state of tension, and caused to have a hold on the shaft to be driven by an adjustable roller and friction-roller, as described.

Benjamin Biram, of Wentworth, York, gentleman. *Improvements in working and ventilating mines.* Patent dated June 4, 1853. (No. 1381.)

A full description of this invention forms the first article of this number.

Claims.—1. The mode of working mines by means of coupled lifting engines and drums.

2. The adaptation of a link motion for

starting, stopping, or reversing coupled engines employed in working mines, as described.

3. The employment, for ventilating mines, of a fan, with blades placed tangentially, or at an angle between a radial and tangential direction.

THOMAS RUSS NASH, of Leigh-street, Middlesex, surveyor. *Improvements in filters.* Patent dated June 4, 1853. (No. 1382.)

Claim.—The placing an interior conical tube, or fine wire-gauze formed into the shape of a tube, in tubular filters, and the insertion of pounded charcoal and sand, or any other purifying medium, between the folds of the filtering medium, as described.

GEORGE CARTER, of Mottingham, Kent, gentleman, and GEORGE MARRIOTT, of Hull, York, colour-manufacturer. *Improvements in the manufacture of white lead.* Patent dated June 6, 1853. (No. 1386.)

The inventors take a quantity of fine ground oxide of lead, called litharge, and to every 100 lbs. thereof add about 25 lbs. of muriate of soda, which must be mixed or triturated until a muriate of lead is formed; then, after thoroughly washing the materials, 5 lbs. of the sulphuric acid of commerce are to be added, and a white sulphate of lead will be the result, which being well washed, dried, and ground, becomes then fit for use.

The inventors claim the manufacture of white lead above described.

JOHN WALTER FRIEND, of Canute-road, Southampton. *An improved method of measuring and registering the distance run by ships and boats proceeding through the water, which is also applicable to measuring and registering tides and currents.* Patent dated June 6, 1853. (No. 1388.)

The inventor constructs a small paddle-wheel, formed and adapted to revolve upon its axis as the vessel is drawn through the water, and connected to a dial fitted with hands, which are actuated by the said paddle-wheel through the intervention of mechanism, in such manner as to register the distance run by the ship or boat.

ANTHONY BERNARD, Baron Von Rathen, of Wells-street, Middlesex. *Improvements in the mode of and in engines for applying motive power.* Patent dated June 6, 1853. (No. 1389.)

The inventor describes and claims a rotary engine.

CHRISTOPHER NICKELS, of Albany-road, Camberwell, gentleman, and JAMES HOBSON, of Leicester, mechanist. *Improvements in weaving.* Patent dated June 6, 1853. (No. 1391.)

Claim.—The application of guides in front of the reed of a loom, in such manner as to receive the pile or surface warp-threads, and actuate the same to open sheds for the passage of the weft, to form the back or body of the fabric, and yet keep the space open in front of the reed, as described.

GEORGE BARETT COLVIN LEVERSON, of St. Helen's-place, London, merchant. *A new application, construction, and arrangement of springs for carriages and such like purposes.* Patent dated June 7, 1853. (No. 1394.)

Claims.—1. The construction of springs by the combination of an elastic bar with compressible springs, as described.

2. The construction of springs by the combination of a toggle-joint with compressible springs, connected or jointed to a rig-bar.

HENRY GEORGE ROWE, ALBERT GEORGE ANDREW, and WILLIAM HENRY ANDREW, of Sheffield, York, cutlery-manufacturers. *Improvements in the mode of fastening the handles of table-knives and forks.* Patent dated June 7, 1853. (No. 1395.)

The tang, or part that fits into the handle, is made flat to correspond in width with the thickness or the breadth of the handle, as the case may be. A groove or slit is cut in the handle by means of a circular saw or other instrument, in such manner that the tang fits tightly into it, and a ferule lets into the handle flush, or with a projection, so that when driven on the handle it converts the groove into a mortice; the tang is then driven in, and secured by rivets driven through it and through the ferule and cheeks of the mortice.

Claim.—Fastening the handles of knives and forks, as described.

FREDERICK LIPSCOMBE, of the Strand, Middlesex, water-filter manufacturer. *Improvements in the construction of ships and boats.* Patent dated June 7, 1853. (No. 1396.)

Claims.—1. The mode of constructing the submerged portion of a ship or boat's hull, as described.

2. The mode of constructing the submerged portion of a ship or boat's hull so that one or more longitudinal sections thereof will show a straight line, or nearly so, descending from the water-line at the bows to a distance not less than nine-sixteenths or greater than forty-nine fiftieths of the entire length of the submerged portion of the hull; the nearly straight inclined line before mentioned having a deflection or curvature not exceeding in length one hundredth part of the straight inclined line added to the length of the straight inclined line.

ALEXANDER MCDOUGALL, of Manchester, Lancaster, manufacturing chemist. *Improvements in the manufacture of potash*

and soda-ash. Patent dated June 7, 1853. (No. 1399.)

These improvements consist in the application of the refuse lime of gas-works as a substitute for the lime or limestone ordinarily used in such manufacture.

FREDERICK LUDEWIG HAHN DAUCHELL, of Elm-grove Villas, Acton-green, Middlesex, engineer, and WILLIAM STARTIN, of Heathfield-terrace, Turnham-green, engineer. *An improved mode of obtaining auriferous deposits from the beds of rivers and lakes, and from pits containing water.* Patent dated June 8, 1853. (No. 1402.)

Claim.—The injecting or forcing of air or other fluid into and through the upper portion of a tube or other conduit, for the purpose of creating an upward current or flow of water through the said tube, by displacing that portion of the column of water which is above the point at which the air or other fluid is injected or forced in; for the purpose of raising auriferous deposits which are under water, as described; or any modification thereof by which the same result may be obtained.

GEORGE TILLETT, of Kentish-town, Middlesex. *Improvements in portable houses and buildings.* Patent dated June 8, 1853. (No. 1403.)

This invention consists in applying metal tubes for the uprights, combined with metal rails, in order to construct the skeleton framing, which is then to be covered with metal, wood, or other material, externally and internally. The tubular uprights are made with slots, to receive the ends of the metal rails, and the metal rails, where they enter the tubes, are notched, to enter each other, by which great strength, with lightness of structure, is said to be obtained, accompanied by a ready means of putting the framework together.

JOHN HORROCKS, jun., and JAMES DUNLOP HORROCKS, of Down-street, Piccadilly, Middlesex. *Improvements in the manufacture of detonating or percussion caps.* (A communication.) Patent dated June 8, 1853. (No. 1404.)

The object of this invention is to manufacture percussion caps in such manner, that the interior surfaces or lining may be flexible and elastic, in order that a cap may tightly and closely fit different nipples, though they may somewhat differ in size and shape; and also fit each nipple in such manner as to be waterproof.

HENRY BERNOULLI BARLOW, of Manchester, Lancaster, consulting engineer. *Improvements in machinery for spinning, doubling, and twisting cotton, and other fibrous substances.* (A communication.) Patent dated June 9, 1853. (No. 1406.)

The patentee describes and claims, *first*, an improved combination of parts particularly applicable to the machines for spinning, called throstles. These improvements relate to the bobbin on which the yarn is wound, and to the parts in connection therewith. And, *secondly*, an improved bobbin, and parts in connection therewith, particularly applicable to machines for doubling and twisting silk.

ANTOINE PONÇON, of Marseilles, France. *Certain improvements in obtaining motive power.* Patent dated June 9, 1853. (No. 1408.)

Claim.—The new motive power described, which the inventor designates "hydroaerial," consisting in the alternate motion of two driving-cylinders under the action of air and water, applied and directed as described.

CLAUDE ARNOUX, of Paris, France, gentleman. *A new system of towing and traction.* Patent dated June 9, 1853. (No. 1409.)

Claim. The mode of employing cords or chains and pullies for towing boats, barges, and other like vessels on canals and rivers, for drawing locomotives and carriages up risings on railroads, for working ploughs, and other similar purposes.

WILLIAM MUIR, of Manchester, Lancaster, engineer. *Improvements in turning lathes, a part of which improvements is applicable to other useful purposes.* Patent dated June 9, 1853. (No. 1410.)

Claims.—1. The method of supporting a leading screw-worm, or any other shaft, by means of a sliding piece, which is depressed when any object passes it, and raised again after it has passed, by mechanism described, or such as is mechanically equivalent to the same.

2. The combination of movements described for throwing the self-acting traversing apparatus out of gear, and the hand-traversing apparatus in gear, simultaneously, and *vice versâ*, or any modification thereof substantially the same in effect.

3. The mechanism of the poppet-head, and the mode of supporting the rest by an additional bearer, either in the case of a single or a duplex lathe; also the hollow spindle, as well as the general combination of all the parts.

JOSEPH SMITH, of Bradford, York, worsted spinner. *Certain improvements in machinery for preparing and spinning wool, hair, silk, flax, and other fibrous substances.* Patent dated June 9, 1853. (No. 1411.)

Claims.—1. The arrangements of machinery or apparatus described, or any modification thereof, for giving tenacity to the fibres of the said material by milling or rolling them together, instead of twisting or spinning the same.

2. The peculiar arrangement of apparatus described for drawing and twisting the fibres at one and the same operation.

3. The apparatus described, or any modification thereof, for imparting both the permanent and artificial twist to the wool or other fibrous material, by passing the same through a tube which revolves round its own centre or axis at the same time that it also revolves around the centre of the spindle.

JOSEPH SMITH, of Bradford, York, worsted spinner. *Certain improvements in combing wool and other fibrous substances.* Patent dated June 9, 1853. (No. 1412.)

Claim.—The use of circular combs, having a compound revolving motion, as described, and the combination therewith of a comb or combs having both a rectilinear and a circular motion imparted thereto in the manner and for the purposes described.

EDWARD MANIERE, of Bedford-row, Middlesex, gentleman. *Improvements in the manufacture of paper.* Patent dated June 9, 1853. (No. 1413.)

This invention consists in applying asbestos in the manufacture of paper. For this purpose the asbestos is to be pulped and manufactured according to the methods practised in making paper of other materials; but by the employment of asbestos a fire-proof paper will be produced. The inventor claims the employment of asbestos in the manufacture of paper.

WILLIAM BROOKES, of Chancery-lane, Middlesex. *Improvements in treating fabrics suitable for floor-cloths, covers, and such like articles.* (A communication.) Patent dated June 9, 1853. (No. 1414.)

These improvements consist in coating fabrics with saponified fatty matters, metallic salts, and dissolved or decomposed India-rubber, combined together and applied in substitution for the ordinary coatings to floor-cloths, tarpaulins, and other covers and such like articles.

WILLIAM BROOKES, of Chancery-lane, Middlesex. *Improvements in the manufacture of boxes, and other hollow receptacles.* (A communication.) Patent dated June 9, 1853. (No. 1415.)

These improvements consist in making boxes or hollow receptacles from paper pulp, combined with other materials, such as rice pulp, cream of lime, or other thickening matter, to give solidity, instead of making them from paper.

JAMES ROBERT NAPIER, of Lancefield-house, Glasgow, Lanark, mechanical engineer and iron shipbuilder, and WILLIAM JOHN MACQUORN RANKINE, of Rosebank-house, Rutherglen, of same county, civil engineer. *Improvements in engines for developing mechanical power by the action of heat or air, and other elastic fluids.* Patent dated June 9, 1853. (No. 1416.)

Claims.—In the first place, the invention and adaptation of a heat-screen, separate and distinct from the plunger, which drives the air or other gas from the hot to the cold end of the receiver, and *vice versâ*, and being adapted to the following purposes:

1. To screen the principal portions of the air, or other gas, from the communication of heat from the furnace or source of heat at convenient times.

2. To receive and store up in its own material at such times the heat communicated from the furnace.

3. To permit and accelerate the communication of heat to the air or other gas at the time when the air or other gas is being expanded.

In the second place, the adaptation of tubular receivers for the purpose of heating and cooling the air, or other gas, in the manner described.

JOSIAH MOORE, of Clerkenwell-close, Middlesex, clock manufacturer. *Improvements in respirators.* Patent dated June 10, 1853. (No. 1419.)

Claim.—The construction of respirators composed of several thicknesses of wire-gauze, placed in a suitable case or frame, to be worn within the mouth.

SAMUEL FRANKHAM, of Greenland-place, Judge-street, engineer. *An improved construction of coupling joints applicable to pipes, vessels of capacity, and other like use.* Patent dated June 10, 1853. (No. 1420.)

The inventor constructs the abutting ends of the parts which are to be connected together, so that in interlocking with each other a recess will be formed for the reception of a layer of vulcanized India-rubber, which is interposed between the abutting ends, and will yield to any pressure put upon it by the expansion of the metal.

Claim.—The mode of coupling tubes and other metal articles, as described, whereby the effect of their contractile and expansive properties will be allowed for, and the soundness of the joint preserved under varying degrees of heat.

ALFRED VINCENT NEWTON, of Chancery-lane, Middlesex, mechanical draughtsman. *An improvement in spinning machinery.* (A communication.) Patent dated June 10, 1853. (No. 1421.)

Claim.—The employment of a thread-carrier, as specified, in combination with a central spindle for winding on, with or without a bobbin or spool, or with the ring, groove, or traveller, or its equivalent.

RICHARD ARCHIBALD BROOMAN, of the firm of Robertson, Brooman, and Company, of 166, Fleet-street, London, patent agent. *Improvements in the manufacture of paper.*

(A communication.) Patent dated June 10, 1853. (No. 1422.)

Claim.—The manufacture of paper from wood and woody fibres, reduced to fibrous pulp by means of mechanical agents, acting in the direction of the length or grain of the said fibres, and parallel thereto, together with water or other suitable liquid applied, as described.

JOSEPH WESTWOOD and ROBERT BAILLIE, both of Poplar, Middlesex, iron ship builders. *Improvements in the construction of iron ships.* Patent dated June 10, 1853. (No. 1423.)

Claim.—The construction of the stem, stern-post, or stern frame, keel, and keelson of iron ships from plates of iron rivetted or otherwise fastened together, as described.

CHRISTOPHER NICKELS, of Albany-road, Surrey, and JAMES HOBSON, of Leicester. *Improvements in the manufacture of carpets and other piled fabrics.* Patent dated June 11, 1853. (No. 1424.)

Claim.—The manufacture of warp or looped fabrics by introducing wires or rods (to produce piled surfaces) transversely across the warp, in place of introducing them at one selvage, and moving them across the fabric, as heretofore.

CHRISTOPHER BINKS, of Albert-villa, North Woolwich, Kent. *Improvements in dryers, and in preparing drying oils for oil paints, varnishes, and other uses.* Patent dated June 11, 1853. (No. 1425.)

The inventor subjects linseed, or other drying oil, to the action of certain metallic oxides, which, whilst in contact with such oils under ordinary atmospheric temperatures, have the property, on exposure to air or to oxygen gas, of absorbing oxygen, and of passing from a lower to a higher state of oxidation; and in the act of this transformation, or as a consequence of it, of inducing in the oil suitable effects. The inventor also describes other somewhat analogous processes.

WILLIAM HENRY SMITH, of Bloomsbury, Middlesex, civil engineer. *Improvements in the permanent way of railways.* Patent dated June 13, 1853. (No. 1427.)

This invention consists in forming a peculiar kind of base-rail.

WILLIAM SMITH, manufacturer, of Sheffield, York. *Improvements in the mode of manufacturing metallic handles for knives and forks, backs for razors, bows for scissors, and the relative parts of such like instruments.* Patent dated June 13, 1853. (No. 1428.)

Claim.—The fitting of knives, forks, razors, scissors, and other such instruments, in dies or moulds, and casting thereon the parts enumerated in the title, as described.

JOHN MARSH, THEOPHILUS MARSH, JAMES MARSH, and WALTER MARSH, trading under the style or firm of Marsh, Brothers, and Co., of Sheffield, York, manufacturers. *An improved mode of fastening the handles of table knives and forks.* Patent dated June 13, 1853. (No. 1429.)

The inventors describe and claim a method of using a nick piece, or shoulder ferule, to which both the blade of the knife, or the prongs of the fork, and the haft or handle are attached.

JOSEPH SPENCER, of Bilston, Stafford, ironfounder and engineer. *A new or improved cupelo.* Patent dated June 13, 1853. (No. 1430.)

Claim.—Adding to the ordinary cupelo and reservoir a second cupelo, so arranged with respect to the first, that the contents of the first cupelo and reservoir, or second cupelo, may either be drawn off separately or both from the same tap-hole; that is, the contents of the cupelo and reservoir drawn off from the tap-hole of the said cupelo, when a larger quantity of iron is required than can be contained in one cupelo.

THOMAS JAMES PERRY, of the Lozells, Aston-juxta, Birmingham, Warwick, engine turner. *An improvement or improvements in raising and lowering Venetian and other blinds, applicable also to the raising and lowering of other bodies.* Patent dated June 13, 1853. (No. 1431.)

Claim.—Constructing an instrument or apparatus for raising and lowering Venetian and other blinds, and other such articles, by connecting the crank lever or handle, by which the cord is wound and unwound, with the axis or drum, on which the said cord is wound and unwound, by means of a joint, and causing the said crank lever or handle to engage or lock itself, and thereby fix the position of the drum, or axis, when the pressure of the hand is removed therefrom, as described.

WILLIAM DAVID PAINE, of Thomas-street, Stamford-street, Lambeth, Surrey, mechanical engineer, and GEORGE ALFRED PAINE, of Clark's-mews, Saint Marylebone, Middlesex, clock-maker. *An improvement in the construction of steam boilers, and in steam boiler furnaces.* Patent dated June 13, 1853. (No. 1433.)

This invention consists chiefly in constructing in the furnace a travelling platform for the reception of the fuel, which platform is composed of bars that lie across the furnace, and are linked together at their ends. These bars traverse over sustaining rollers, or axles, to which rotary motion is communicated in any convenient manner.

Claims.—1. The employment of travelling fire-bars, constructed as above explained, whether applied to the furnaces of stationary, marine, or locomotive boilers.

2. Constructing the flues of locomotive boilers as described.

Robert Hopkins, of Manchester, Lancaster, mechanical engineer. *Improvements in machinery or apparatus for cutting and shaping cork, wood, and other similar substances.* Patent dated June 13, 1853. (No. 1435.)

Claim.—The general arrangement and construction of the machine or apparatus with the feeding-apparatus, and peculiar form of the cutting tools, with the application of the finger-rods, as guided through the hollow spindles, either with single, double, or compound action, as described.

William G. Craig, of Newport, Monmouth, engineer. *Improvements in axle-boxes, guides, and bearings of locomotive engines and carriages, parts of which improvements are applicable to the bushes and bearings of machinery.* Patent dated June 14, 1853. (1437.)

Claims.—1. Casting the lower portion or piston of the spring in one piece with the rest of the axle-box.

2. The use of the spring coverings as a substitute for, and in place of the ordinary horn plates, and causing the same to act as guides to the axle-boxes.

3. The elastic packing between the spring-piston and the case.

4. The arrangements described for preventing the lateral motion of axles, by the use of elastic materials, whether applied to the axle or to the wheels, or any mere modification thereof.

5. The combination of wood and metal in the construction and manufacture of bearings for axles and machinery.

Robert William Sievier, of Upper Holloway, Middlesex, gentleman, and James Crosby, of Manchester, Lancaster, manufacturer. *Improvements in looms for weaving.* Patent dated June 14, 1853. (No. 1438.)

Claims—1. The construction and application on both sides of the loom of a compound shuttle-box, as set forth. Also, the means or arrangement of parts, or any mere modification thereof for actuating the same, and also holding or retaining the box in the required position while the shuttle is being thrown; and this mode of holding or retaining the shuttle-boxes, if adapted to regulate the position of the rising of falling-boxes now in use.

2. A method of varying the pattern, by means of altering the position of the ends of the needles, wires, or rods, as described, so that they may come into a line with a different row of holes, punched in the cards, and in the cylinder of the Jacquard apparatus; and the application of the Jacquard apparatus for this purpose, whether it be actuated in the way shown, or by causing the Jacquard cylinder to move up or down.

PROVISIONAL PROTECTIONS.

Dated October 20, 1853.

2428. Jonathan Woofenden, of Belfast, Antrim, Ireland, engineer. Improvements in power looms for weaving.

Dated November 1, 1853.

2532. Thomas Sanders Bale, of Cauldon-place, Stafford, China-manufacturer, and Daniel Lucas, of Stoke-upon-Trent, same county, artist. Improvements in ornamenting the materials of, and articles manufactured in pottery, as bricks, tiles, slabs, &c., and also in glass, slate, stone, and other plastic substances.

Dated November 2, 1853.

2542. Benjamin Butterworth, of Calder Cottage, Caldershaw, near Rochdale, Lancaster, grocer. Improvements in combining oil with other liquids for the obtainment of a new lubricating compound. Partly a communication.

Dated November 3, 1853.

2554. Peter Hindle, of Ramsbottom, Lancaster, manufacturer. Improvements in power looms for weaving.

Dated November 4, 1853.

2558. James Scott, of Shrewsbury, Salop, carriage and wagon inspector of the Shrewsbury and Birmingham Railway Company. An improved apparatus for shifting carriages, wagons, engines, and other vehicles on railways and tramways.

Dated November 12, 1853.

2622. Stephen Barker, of Birmingham, Warwick, manufacturer. An improvement or improvements in shaping metals.

Dated November 15, 1853.

2648. Joseph Fry, of Cannon-street West, London, merchant. Improvements in preparing solvents for India-rubber and gutta percha, and in rendering waterproof fabrics free from odour.

Dated November 26, 1853.

2755. Joseph Wormald, of Vauxhall, and George Pollard, of York-road, Lambeth. An improved pipe-wrench.

2757. Joseph Stenson, of Northampton, civil engineer and iron-manufacturer. Improvements in the manufacture of iron.

2759. Hippolyte Coutte and Jean Michel Hammerbacher, of Paris, France. An improved machine for washing linen and other textile articles.

2761. Auguste Edouard Loradoux Bellford, of Castle-street, London. Certain improvements in straining mill-saws. A communication.

2763. Thomas Chambers and John Chambers, of the Thorncliffe Ironworks, near Sheffield, York. Certain improvements in kitchen sinks.

2765. Joseph Michel Henri Perodeaud, civil engineer, of Rue Godot de Mauroy, Paris, France. An improved mode of treating peat for the conversion of the same into an artificial coal, which may be used in that state or afterwards reduced to coke.

Dated November 28, 1853.

2767. John Walmsley, of Accrington, Lancaster, manufacturer, and John Ingham, of Blackburn, same county, mechanic. Improvements in looms.

2769. Robert Hawkins Nicholls, of Bedford, gentleman. Improvements in hoeing and otherwise cultivating land.

2772. Alexander Macomie, of Percy-street, Rath-

bone-place, Middlesex. An ornamental piece of furniture, shaped like a vase, constructed to contain or form a writing and drawing-desk.

Dated November 29, 1853.

2775. Patrick Kelly, of West-street, Drogheda, printer. An improved apparatus for cultivating, preparing, and treating land, and for sowing seeds.

2779. Joseph Moore, of Lincoln, gentleman. An improvement in or addition to ploughs.

Dated November 30, 1853.

2781. Joshua Jackson, of Wolverhampton, Stafford, manufacturer. A new or improved signalling apparatus.

2782. John Elce, of Manchester, machine-maker. Certain improvements in machinery for spinning.

2783. Peter Armand Lecomte de Fontainemoreau, of Rue de l'Echiquier, Paris, France. Certain improvements in the construction of the Jacquard-machine. A communication from Mr. Raymond Ronze, of Lyons, France.

2784. Edward Keating Davis, of Howley-street, Lambeth, Surrey, metal pipe-manufacturer. Improvements in machinery for making pipes, sheets, still-worms, and other articles, from that class of metals called soft metals, as lead, tin, zinc, bismuth, or alloys of soft metals, that are capable of being forced out of metal receivers or chambers, through dies, cores, &c.

2785. John Hewitt, of Salford, Lancaster, machine-maker. Certain improvements in machinery or apparatus for spinning cotton and other fibrous substances.

2786. Joseph Redford, of Pilkington, near Manchester, Lancaster, weaver. Certain improvements in power-looms.

2787. Richard Balderstone, of Blackburn, Lancaster, overlooker. Improvements applicable to spinning-machines known as mules, and to machines of similar character for clearing or cleaning certain parts of such machines.

2788. John Patterson, of Beverley, York, engineer. Improvements in land-rollers or clod-crushers.

2789. Alphonse Loubat, of Paris, France, gentleman. Improvements in the construction of tramways.

2790. Lewis Jennings, of Fludyer-street, Westminster, mechanical engineer. An improved mode of producing plain and ornamental sewing, and in machinery applicable thereto.

2791. Norbert de Landtsheer, of Ghent, Belgium. Improvements in machinery for combing flax or other fibrous material.

2792. Francis Sewell Cole, of Childown, Surrey. A smoke-consuming apparatus for enabling every fire to consume its own smoke.

Dated December 1, 1853.

2793. Thomas Garnett, of Low Moor, near Clitheroe, Lancaster, manufacturer, and Daniel Adamson, of Dukinfield, Chester, engineer. Improvements in generating steam and in consuming smoke.

2794. Auguste Edouard Loradoux Bellford, of Castle-street, London. Improvements in machinery for manufacturing horse-shoes. A communication.

2795. Alfred Isaac Jones, of New Oxford-street, London. An improved cigar-light.

2796. Joseph Dilworth, of Preston, Lancaster, engineer. Improvements in escape-valves and safety-valves.

2797. Thomas Hollinsworth and John Hollinsworth, both of Winwick, near Warrington, Lancaster, engineers. Certain improvements applicable to "alarm whistles" to be used upon railways, or as signals where otherwise required.

2798. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in the treatment or manufacture of caoutchouc. A communication from Charles Eugene François Guibal, and Louis Philippe Bernard Edouard Cumenge, of Paris, France, manufacturers.

2799. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Certain applications of vulcanized India-rubber. A communication from Charles Eugene François Guibal, of Paris, France, manufacturer.

Dated December 2, 1853.

2800. James Reilly, of Thomas-street, Manchester, Lancaster, chair-manufacturer. Improvements in machinery or apparatus for tenonting, mortising, and sawing wood, metal, or other materials.

2801. Arthur Wellington Callen, of Peckham, Surrey. An improved excavating and dredging-machine. A communication.

2802. Auguste Edouard Loradoux Bellford, of Castle-street, London. Improvements in blocks for ships and other uses. A communication.

2803. Henry Deacon, of Widnes, Lancaster, manufacturing chemist, and Edmond Leyland, of St. Helen's, same county, builder. Improvements in apparatus for the manufacture or production of sulphuric acid.

2804. Alexander Brown, of Glasgow, Lanark, cask-manufacturer. Improvements in metallic casks and other vessels.

2805. George Williamson, of Glasgow, Lanark, manufacturer. Improvements in applying motive power.

2806. Alexander Bain, of Paddington, Middlesex, engineer. An apparatus for damping paper and other substances, in order to prepare the same for the reception of labels, stamps, and other like articles coated with a gummy or adhesive matter.

2807. John Charles Wilson, of Redford Flax Factory, Thornton, Kirkcaldy, North Britain. Improvements in machinery for scutching flax, hemp, and other fibrous materials.

2808. George Collier, of Halifax, York, mechanic. Certain improvements in looms for weaving.

2809. Robert Reyburn, of Baker-street, Greenock. Improvements in sugar-refining.

2810. Samuel C. Lister, of Bradford, York, manufacturer. Improvements in combing wool, hair, cotton, and other fibrous materials.

2811. Henry Bessemer, of Baxter House, Old St. Pancras-road, Middlesex, engineer. Improvements in the manufacture and refining of sugar

2812. Jonathan Saunders, of St. John's Wood, Middlesex. Improvements in the manufacture of rails for railways.

Dated December 3, 1853.

2814. Abraham Rogers, coal-proprietor and miner, Bradford, Yorkshire. Improvements in ventilating sewers, mines, or other subterranean works.

2816. William Dray, of Swan-lane, London, agricultural-implement maker. Improvements in the construction of portable houses and buildings.

2818. Henry Jeremiah Iliffe and James Newman, of Birmingham, Warwick, manufacturers. Certain improvements in the construction of metallic bridges and other similar structures.

Dated December 5, 1853.

2820. Squier Cheavin, of Spalding, Lincoln, plumber and glazier. A double action or belt-filterer.

2822. William Simons, of Glasgow, Lanark, ship-builder. Improvements in propelling and steering vessels.

2824. John Patterson, of Beverley, York, engineer. Improvements in reaping-machines.

2826. James Robertson, of Kentish Town, Middlesex, cooper. Improvements in the consumption or prevention of smoke.

Dated December 6, 1853.

2828. Edward Oldfield, of the firm of Oddy, Ro-

binson, and Co., of Salford, Lancaster, machine-makers. Improvements in machinery for spinning and doubling.

2834. William Edward Gaine, of Harewood-street, Harewood-square. An improvement in treating or preparing paper.

2836. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in printing oilcloths and other fabrics. A communication from Benjamin Underwood, of Brooklyn, New York, America.

2838. John Hargrave, of Kirkstall, York, worsted manufacturer. Certain improved apparatus for washing and scouring wool.

NOTICES OF INTENTION TO PROCEED.

(From the "London Gazette," December 20th, 1853.)

1650. George Dalton. Improvements in reverberatory and other furnaces.

1728. Edward Cockey, Henry Cockey, and Francis Christopher Cockey. Improvements in the manufacture or production of cheese.

1741. Samuel Barlow, junior, and John Pendlebury. Certain improvements in machinery or apparatus for bleaching or cleansing textile fabrics or materials.

1822. George Armitage. Improvements in the construction of presses.

1823. Charles Butler Clough. Improvements in machinery or apparatus for washing, scouring, cleansing, or steaming woven fabrics, either in the piece or garment, also felts or fibrous substances, and corn, roots, seeds, or similar matters.

1826. Barthelemy Louis Francois Xavier Fléchelle. Certain improvements in the means of carrying bedding, and bathing the injured, ill, or invalid persons.

1935. Richard Roberts. Improvements in the construction of casks and other vessels.

2153. William Shelbourne Icely. Improvements in mechanical telegraphs.

2167. Henry Constantine Jennings. Improvements in treating and bleaching resinous substances.

2272. Alexander Turiff. Improvements in retarding apparatus for the prevention of accidents on railways.

2328. John Colin Sharp. Improvements in retarding apparatus for the prevention of accidents on railways.

2401. Alphonse Doste Noel. Improvements in the manufacture of zinc white. A communication from Louis Pierre Geslin.

2464. David Bogue. An improved mode of producing printing surfaces. A communication.

2532. Thomas Sanders Bale, and Daniel Lucas. Improvements in ornamenting the materials of, and articles manufactured in pottery, as bricks, tiles, slabs, &c., and also in glass, slate, stone, and other plastic substances.

2622. Stephen Barker. An improvement or improvements in shaping metals.

2643. Joseph Fry. Improvements in preparing solvents for India-rubber and gutta percha, and in rendering waterproof fabrics free from odour.

2674. Perceval Moses Parsons. Improvements in railway and other carriages and vehicles.

2683. Patrick Benignus O'Neill. An improvement in the manufacture of perforated buttons. A communication.

2697. Richard Farmer Brand. Improvements in fire-arms and ordnance.

2718. Francis Arding. Improvements in machinery for cutting, splitting, and bruising vegetable substances.

2723. John Hill, senior, and John Hill, junior. Improvements in machinery for winding, doubling, and spinning silk.

2737. Samuel Cunliffe Lister. Improvements in combing wool, cotton, and other fibrous materials.

2740. Daniel Lancaster Banks. Improvements in rotatory engines.

2762. Louis Cornides. Combining gelatine with certain other substances, and colouring the same, so as to produce various objects capable of resisting atmospheric influences.

2763. Thomas Chambers, and John Chambers. Certain improvements in kitchen sinks.

2790. Lewis Jennings. An improved mode of producing plain and ornamental sewing, and in machinery applicable thereto.

2805. George Williamson. Improvements in applying motive power.

2807. John Charles Wilson. Improvements in machinery for scutching flax, hemp, and other fibrous materials.

2808. George Collier. Certain improvements in looms for weaving.

2810. Samuel C. Lister. Improvements in combing wool, hair, cotton, and other fibrous materials.

2811. Henry Bessemer. Improvements in the manufacture and refining of sugar.

2812. Jonathan Saunders. Improvements in the manufacture of rails for railways.

2820. Squier Cheavin. A double-action or belt filterer.

2838. John Hargrave. Certain improved apparatus for washing and scouring wool.

Opposition can be entered to the granting of a Patent to any of the parties in the above List, who have given notice of their intention to proceed, within twenty-one days from the date of the *Gazette* in which the notice appears, by leaving at the Commissioners'-office particulars in writing of the objection to the application.

WEEKLY LIST OF PATENTS.

Sealed December 12, 1853.

2393. Ellen Jones.
2426. Julius Augustus Roth.
2447. John Henry Johnson.
2460. James Denoon Young.

Sealed December 14, 1853.

1437. William G. Craig.
1450. John Macintosh.
1659. William Francis Snowden.
2001. Edward Patrick Gribbon.
2133. Charles Townsend Hook.
2352. Henry Whitaker Butterworth.
2417. Thomas Thompson.
2421. William Russell.

Sealed December 15, 1853.

1446. Thomas Butterworth.
1449. Charles Wye Williams.

Sealed December 16, 1853.

1461. William Christopher and Gustavus Gidley.
1462. John Blair.
1464. Jules Alexis Adrien Dumoulin.

Dated December 17, 1858.

1477. Auguste Edouard Loradoux Bellford.

1478. Robert Lister.

The above Patents all bear date as of the day on which Provisional Protection was granted for the several inventions mentioned therein.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Proprietor's Names.	Addresses.	Subject of Design.
Dec. 22	2542	H. Barlow & J. Kay	Manchester	Blind-apparatus.
,,	2543	C. Meinig	Leadenhall-street	Grindstone-frame.

NOTICES TO CORRESPONDENTS.

N. S.—We were somewhat unprepared for the allegations contained in your note. You would do well to look through our last few Numbers again, and compare the *Mechanics' Magazine* with other similar journals; and you would then, probably, arrive at a different conclusion. But, however this may be, you will have no such causes of complaint, we think, after the intended alteration is effected in our first January Number. You may rely upon the accuracy of the statements made in the articles you last allude to.

David Hope.—We regret that the error, corrected in the *errata* below, was inadvertently made in our reply to your question.

J. A. W., Devonport.—Yours is received, with pleasure.

J. C., Deptford.—Your reply to Mr. De Penning's letter, on the Screw Propeller, will be inserted in our next.

J. M., Aberdeen. — We shall be glad to take notice of your paper, which seems to be important, if you can forward to us a description of your invention (accompanied with a sketch, if necessary); the detail of experiments would be almost useless without this. You seem to have already made it public, to some extent, or we should not request you to send it.

Errata.—In the last Number, under the head "Notices to Correspondents," in the reply to David Hope, 16th line, *for* "former" *read* "latter;" and 19th line, *for* "latter" *read* "former."

CONTENTS OF THIS NUMBER.

LONDON: Edited, Printed, and Published by Richard Archibald Brooman, of No. 166, Fleet-street, in the City of London.—Sold by A. and W. Galignani, Rue Vivienne, Paris; Machin and Co., Dublin; W. C. Campbell and Co., Hamburg.

Mechanics' Magazine.

No. 1586.] SATURDAY, DECEMBER 31, 1858. [Price 3d. Stamped 4d.

Edited by R. A. Brooman, 166, Fleet-street.

TOPHAM'S PATENT FLUID-METERS.

Fig. 2.

Fig. 1.

TOPHAM'S PATENT FLUID-METERS.

(Patent dated June 22, 1853.)

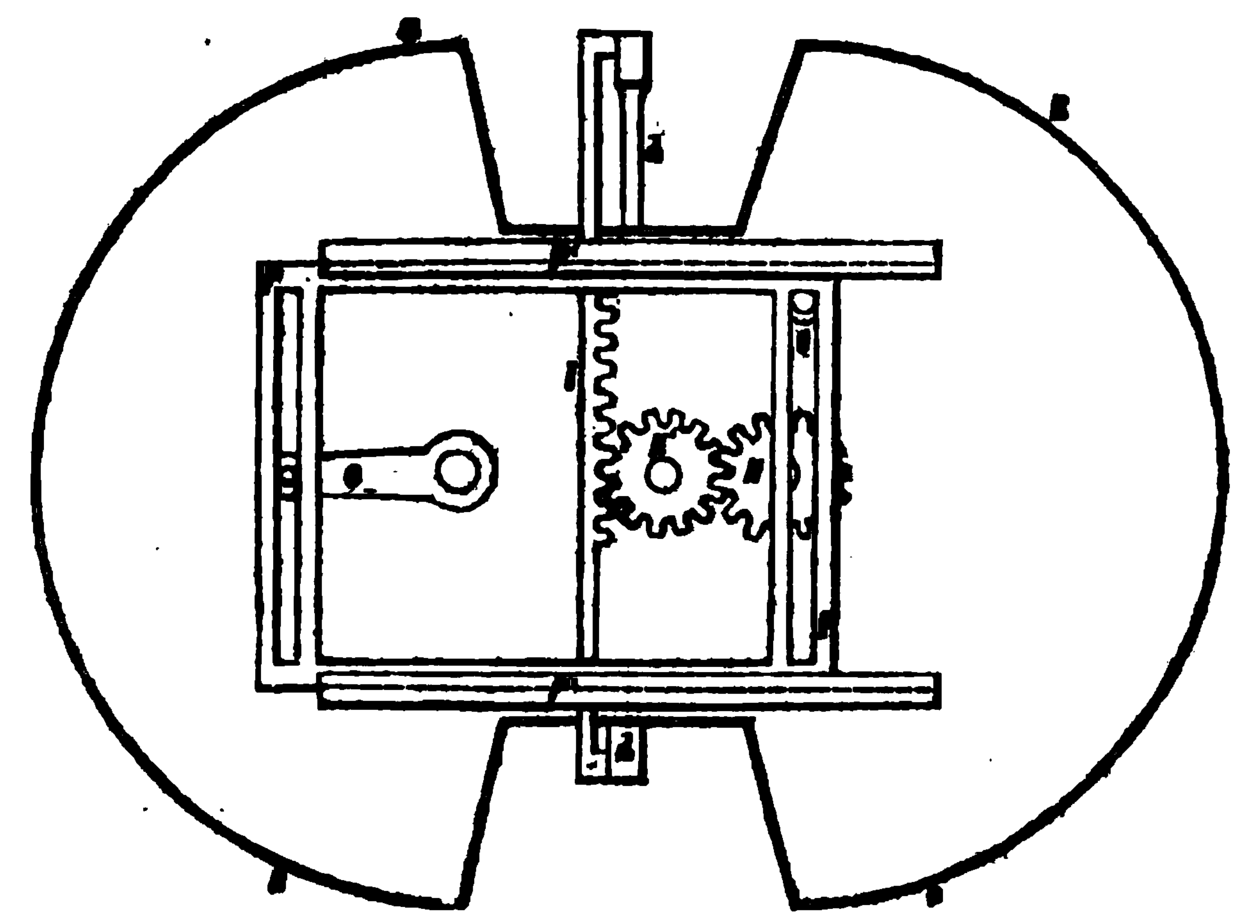
Mr. Topham's invention consists in measuring and regulating the flow of liquids, gases, and other elastic fluids, by means of a box or case fitted with a stop or stops, in each of which is a passage open for the outlet of water or other fluid through a slide, which is caused to reciprocate and open or close the passage, as may be required. Or a semi-rotary valve may be employed, having four ways, two for the inlet and two for the outlet of the water to be passed through the meter. In the centre of the case the inventor mounts a piston, which is caused to oscillate upon trunnions by the force of the water to be measured entering in at one side through the slides or valves, and thereby filling the case. When the slides or valves become reversed, water is caused to enter at the opposite side of the piston, and in so doing it forces out the water on the other side through the exhaust port until the whole of the water has been thus passed through the case and measured; the number of oscillations of the piston being indicated by an index or dial in front of the apparatus. He constructs his valve in connection with the source of supply, so as to regulate the flow of liquids or fluids to the meter in such manner that the increase of pressure of the inflowing liquid or fluid shall act upon the valve, and thereby cause it to gradually narrow the orifices for the inlet to the meter. Instead, also, of this piston in the apparatus being employed only to register the quantity of liquid or fluid passed through it, it may be made to communicate motion to a shaft for purposes of power.

The accompanying engravings represent different views of a machine constructed according to these improvements. Figs. 1 and 2 are sections, and fig. 3 is a view of the meter, with the outer case removed. Similar letters refer to similar parts in all the figs. A A is the outer case, and B B the inner case, the space between them being filled with the water to be measured, which flows in through the pipe, C. D is a strainer, through which the water to be measured is passed in order to clear it. E E^1 are two sets of pistons, which reciprocate and serve to open and close the inlet and exhaust-ports for the admission and outlet of the water into and from the inner case. F F^1 are pistons, which turn upon trunnions in the interior of the case, B, and oscillate between the stops, G G. H H^1 are pinions upon the spindles of the pistons, F F^1, which gear into racks, I I^1, connected to the rods, *d d*, of the pistons, E E^1. K is a pipe for the outflow of the measured water. L is a valve or plug, placed between the pipe, C, and the inlet to the space between the cases A and P, to regulate the oscillation of the pistons, F F^1, so as to keep them at one uniform and regular speed, independent of the pressure of the water to be passed through the meter. This valve works in a cylinder, checks being cut in the valve for the passage of the water or other liquid or fluid. N is a spindle or rod projecting from the valve, and terminating in the button, N^1, which presses against a spring or disc of India-rubber, N^2. N^3 is a hollow or recess formed in the end casing of the valve, into which the India-rubber is forced when the pressure of the inflowing water is in excess; at the same time the valve is forced into the cylinder, M, and thereby closes the orifices for the inlet of the water. Upon the decrease of the pressure of the water, the India-rubber disc returns the valve to the position in which it was first set. O O are cranks upon the spindles of the pistons, F F^1, the crank-pins of which are passed through slots in the frames, P P, which slide in the guides, P^1 P^1, on the inner case, B. The purpose of these cranks and frames is to preserve the pistons, F F^1, always in their relative position, and also to insure their going to the end of their stroke, so as to completely empty the case of the measured fluid or liquid, and prepare it for receiving the full quantity it is calculated to contain. The action of this meter is as follows:—The water to be registered flows in through the pipe, C, and strainer, D, from whence it passes through the regulating-valve into the space between the cases, A and B; and, supposing the pistons to be in the position represented in fig. 2, the side of the case, B, containing the piston, F, would be full of the measured liquid, the parts in connection with the pistons, E, just commencing to open to allow a fresh supply of water to flow in to be measured, and also to admit of the measured water running off. The opposite side of the case, or that which contains the piston, F^1, being half filled with measured and unmeasured water, the induction and eduction ports of the pistons, E^1, being both open for the inflow and outflow of the water or other liquid or fluid to be measured.

The inventor also describes a modification of the preceding arrangement, in which one case and but one piston alone are used. There is in this a semi-rotary valve having four

ways for the inlet and outlet of the water which flows in, and escapes alternately from the ports. The meter or other liquid or fluid to be measured flows in through a pipe, and surrounds the valve, entering the case through one port, and thereby exerting a pressure behind the piston, so as to cause it to turn upon its centre, and to force the measured

Fig. 3.



liquid or fluid through the other port into the exhaust-pipe. When the piston arrives at the end of the stroke, the valve is reversed, and the meter caused to take the opposite direction, which continues until the whole of the liquid or fluid to be measured is passed through the meter. Should it be desired, and where the pressure of water is sufficient, this apparatus may be employed as a power engine.

LOCOMOTION ON THE SURFACE OF THE WATER.

FROM A CORRESPONDENT, N. B.

(*Concluded from page* 509.)

In the *Courrier de l'Europe* of the 17th instant, a letter appeared from Mr. Damiani, of Liverpool, on the subject of M. Planavergne's invention, of which an account had been published in that paper. He informs the Editor that he and a friend of his, Mr. Rich, of Liverpool, have made many successful experiments with a model of a hydro-locomotive invented by the latter, which, though bearing the same name, is quite unlike that of M. Planavergne, of which he says, "In reading the description given by M. Planavergne of his hydro-locomotive, we have not yet been able to come to any other conclusion than that his notions are completely visionary (*théoriques*). If he had made all the experiments we have, he would have avoided many errors, of which it will suffice to mention two of the most evident." The first of these is, that since M. Planavergne's vessel is heavy it must displace water, which will render the invention futile by preventing the attainment of the high velocities in which he calculates,—rather a hasty disposal of the question, I think. The second objection made by this gentleman is, that the cells would always be partially filled with water, which would add materially to the weight of the vessel.

The locomotive invented by Mr. Rich is supported on cylinders in the same way as the other, but has no air cells. "The results of our experiments have proved to us," says Mr. Damiani, "that at every revolution of the cylinders the locomotive advances through a space equal to the circumference of a circle, having the water-line for its tangent; and for its centre the axis of the cylinder."

Mr. Rich does not seem to entertain the notion that the vessel will be supported by

a fluid resistance increasing with the square of the velocity, but makes his cylinders of sufficient magnitude to support the vessel by their displacement; and from the results obtained on the Mersey from his model, having cylinders 12 inches in diameter, he draws the conclusion, that "with a hydro-locomotive, having cylinders 40 feet in diameter, and making 60 revolutions per minute, a velocity of 42 miles an hour would be obtained;" the writer concludes by inviting M. Planavergne to honour him with a visit, that he may be able to show him the experiments.

At the conclusion of the articles in *La Presse*, from which my description of M. Planavergne's invention is extracted, the editor apologises to M. Mondot de la Gorce, an engineer in the service of the French government, for having treated this invention as entirely new, although another somewhat analogous was invented by him, and noticed by *La Presse* in 1844; then quoting from a book published by him in that year, on "Chemins de Fer Flottants dans la Méditerranée," it describes M. Mondot's invention as consisting in causing a drum or cylinder, 18 feet in diameter and 30 feet long, to roll on the water; this drum is the ship, and contains motive power, passengers, luggage, &c. Large circular holes are cut in the ends of the drum for the admission of air and light, and it is propelled by a common locomotive engine, running on a line of rails encircling the interior of the drum at the middle of its length, and of course producing motion in the same way as a squirrel does in a revolving cage; the passengers are packed in and upon the locomotive, by which clever contrivance certain disagreeable consequences of this kind of navigation are avoided. So far the inventions are entirely dissimilar; but on the surface of the drum M. Mondot constructs the cells, which enter so largely into M. Planavergne's calculations, without, however, doing any more towards explaining their useful effect than that gentleman has done; he only tells us that the drum will rest above the level of the water, without so much as being wetted by it. The editor concludes by saying, "that the new system has occupied the thoughts of an engineer of so much merit, before becoming the object of the ardent and persevering studies of a man possessing the knowledge of M. Planavergne, is certainly no small recommendation to it. Let us add that, after ten years' reflection, the confidence of M. Mondot in the excellence of the plan is not weakened. This confidence renders the modesty and disinterestedness of M. Mondot de la Gorce the more worthy of remark; for it is not, as may be thought, at his request that we have mentioned his labours, but, on the contrary, nearly in spite of him—for the ease of our own conscience, and in the interest of the cause."

Nearly analogous to this class of invention is one patented in April, 1853, by Mr. D. S. Brown, and described by him in a pamphlet, entitled "America in Forty-eight Hours, and India and Back in a Fortnight;" by which he effects improvements in ship-building "which consist in sustaining the hulls of ships on the surface of the water, when in motion, by an upward pressure resulting from such motion, or from other motion or action, instead of allowing such hulls to be supported by the upward pressure obtained by simple immersion only, and which may be accomplished by balancing the ship in such a manner that her bottom (which is flat) shall form an inclined plane to the surface of the water. The effect of this will be, when she is in motion, to raise the whole hull to the surface of the water, thereby removing entirely the resistance at the bows."—"This is but another illustration of the principle well-known to every school-boy who has thrown a stone slantingly on the water, making what is vulgarly called a duck and a drake." If the school-boy has thought at all upon the matter, it will have become evident enough to him that the stone rebounds because the momentum with which it strikes the water is less than the fluid resistance generated by the rapid motion of the stone; and he will also see that since Mr. Brown's vessel has no velocity with regard to the water, *when it is sustained on the surface*, there is not the slightest analogy between the two cases, and his vessel will be unsupported. But if it will not glide upon the surface, will it not be considerably lifted, and the resistance thereby diminished? I am afraid, Sir, to trespass much further on your kindness, but I beg permission to give one of Mr. Brown's examples, and to examine the accuracy of his calculations—the inference which may be drawn from the result will answer the question:—"Suppose," says he, "for example, an inclined plane of one foot in the hundred were sufficient to raise the hull of a vessel of 100 tons burden to the surface of the water when going at the rate of thirty miles an hour, there would then be no resistance at the bows, but a constant backward resistance at the bottom of one ton. Now, suppose, again, we wish to increase the speed of the vessel to sixty miles an hour, all that is necessary would be to reduce the angle of the inclined plane at the bottom from one foot in 100 to one in 400, the backward resistance would still be only one ton in-

stead of four tons, were the angle not reduced; but the velocity of the vessel being doubled, she would require twice as much power, and not eight times as much as in the case of an ordinary steamer." . . .

"But as the engines would be required to be twice as powerful, it becomes necessary to ascertain whether the vessel would be able to sustain the additional weight which they would entail, a problem which is very easily solved. When the velocity was assumed to be thirty miles an hour, the angle of the inclined plane was taken at one foot in the hundred, the backward and upward pressure of the water being in the same proportion. Now, when the velocity is sixty miles an hour, the angle is assumed to be diminished from one foot in 100 to one foot in 400, and the backward and upward pressure in the same proportion; but although the angle is thus reduced to one quarter as much as it was, the backward pressure is still one ton by reason of the increased motion; it therefore follows that the upward pressure against the bottom of the vessel must be 400 tons instead of 100. The carrying capabilities of the vessel have been therefore quadrupled, and she is consequently able to sustain more than the required weight of engines necessary to propel her twice as fast; and moreover there appears to be no limit to the speed that can thus be obtained on the water, as the carrying capabilities of the ship increase in a ratio twice as fast as the velocity."' Let us take the inclination at $\frac{1}{10}$ and $\frac{1}{40}$ instead of $\frac{1}{100}$ and $\frac{1}{400}$ to save labour, and let V and $2v$ be the velocities, 30 and 60 miles per hour; A and $\frac{A}{4}$ the angles of inclination. Then the velocities perpendicular to the bottom in the two cases will be V sin. A and $2v$ sin. $\frac{A}{4}$, and the resistances Cv^2 sin.^{2} A and $4Cv^2$ sin.^{2} $\frac{A}{4}$ (C being some quantity depending on the nature of the fluid and the area of the bottom); of these Cv^2 sin.^{2} A. cos. A and $4C v^2$ sin.^{2} $\frac{A}{4}$ cos. $\frac{A}{4}$ would lift the ship; but the angles being small, the cosines will nearly equal unity, so that the two forces will be to each other as sin.^{2} A : 4 sin.^{2} $\frac{A}{4}$ (that is) as $\frac{1}{100}$: $\frac{4}{1600}$; showing that the reduction of the angles has reduced the supporting force to one-fourth of its original amount instead of increasing it fourfold, as Mr. Brown asserted it would—of course, therefore, the whole of his conclusions are false. The example I have given is taken quite at random, and is a very good specimen of the nature of the scientific investigations in Mr. Brown's book.

Fictions of the imagination are sometimes very beautiful things, and he who incredulously peers too closely into their constitution deprives himself of much real pleasure. Perhaps the inventors in question have assumed the truth of this fact; or it may be that the estimate I have formed of the value of their inventions does no more credit to my scientific acumen than to my poetic susceptibility; should it be so I shall be most happy to receive the chastisement due to my presumption in treating the gentlemen so discourteously, and in trespassing so long upon the patience of your readers.

Sheerness.

AN IMPROVED COKING-CRANE.

In consequence of the great wear and tear of coke-skips used for coking engines, at the Manchester Station of the London and North-Western Railway, and the necessity that more particularly existed about two years ago for coking the engines in the least possible time, owing to the limited space for the traffic that then existed, Mr. John Ramsbottom, of Manchester, designed a very simple and convenient coking-crane, the following description of which we take from a paper lately read by that gentleman before a general meeting of the Institution of Mechanical Engineers:

"The crane, shown in elevation in the accompanying engraving, consists essentially of a large wheel or circular rim, 20 feet in diameter, made of iron segments, A A A, supported by arms, twenty in number, mounted upon one common post or pillar, C C, and so disposed that they may be considered the jibs of so many small cranes. The pillar revolves upon bearings at top and bottom, and each arm or jib is tied by a rod, D D, to a hollow cast-iron cone, which is fastened upon the top of the pillar, and is adjusted by means of a screw and nuts. In fact, the whole may be considered, so to speak, as twenty small cranes working from one common centre. Around the circumference of the rim are suspended, at equal distances, twenty wrought-iron cylindrical buckets, E E E, 2 feet 6 inches diameter, and 2 feet 8 inches deep. Each bucket is fitted with a bow-handle and swivels, so as to be readily turned over when its load is to be discharged. The segments, A A A, are also provided with teeth upon the lower edge, which gear into a pinion, G, and the movement is carried forward to the handle, H, by means of the two pairs of bevel-wheels, and in such proportion as to give 115 revolutions of the handle for one

of the crane. The chief peculiarity, however, consists in the main post being fixed in an inclined position. This is done to such an extent as to throw one side of the rim 6 feet higher than the other; and it will be seen from the engraving that the buckets on one side are sufficiently low to be filled direct from the wagon, L, and on the other sufficiently high to deliver their loads upon the tender, M. The buckets hold in the aggregate 3 tons of coke, so that the crane will carry, ready for delivery at a moment's notice, sufficient coke to supply three passenger or two goods engines, at least. Of course, when the crane is fully loaded, the whole is in equilibrium, and it can then be moved by a force sufficient to overcome the friction only; on the other hand, the greatest power is required when the buckets are empty on the descending side and full on the other. The proportion given, however, will enable one man to work it under the worst circumstances.

"In using this crane (said the inventor), the practice is to keep the buckets full, as far as circumstances will allow, and any engine requiring coke, has the tender backed under the higher edge of the crane; the cokeman then turns the crane round by the handle previously described, and continues to do so until the fireman or other person has turned over as many buckets of coke as are required. The time rarely exceeds two minutes for the delivery of 21 cwt. of coke, and is often less.

"As respects the saving of labour, it may be mentioned that four men were formerly required to deliver coke at this station, and it is now delivered by two, and the skips are dispensed with.

"The fact that this little machine has worked very satisfactorily during the last two years, has induced the writer to bring it before this meeting; it evidently possesses the advantage of carrying a considerable quantity of coke ready for immediate delivery, and of elevating, advancing, discharging, returning, and lowering the buckets by one simple movement.

"There is one slight drawback, however, namely, that an engine cannot run past it, owing to the chimney; but where this is considered necessary, the crane may readily be fixed about 3 feet further from the rails, and the coke delivered by a moveable shoot."

At the conclusion of the reading of Mr. Ramsbottom's paper, the chairman observed, that he had seen the coking-crane described in the paper, and thought it a very simple and efficient plan; the one

objection that had been named — of not leaving space for passing along the line by the side of the crane, might probably be remedied in several ways if required in another situation.

Mr. Ramsbottom said, that object had not been thought of at all in the present case, as it was at the termination of the line, where it could not be extended beyond the crane, and that was the only one on the plan at present tried. The crane had been found very convenient for use, as it required very little power to work it, and held a large store of coke always ready for loading the tenders; it had been in constant work for more than two years, with scarcely any expense for repairs.

Mr. Cowper thought the crane was well contrived for the purpose, and suggested that it might readily be made applicable to a situation where a clear passage was required on the line past the crane, by omitting a portion of the buckets on one side, perhaps one-third, which would always allow the passage of a train, when the blank side was turned towards the line; the same quantity of coke might be carried by increasing the size of the buckets or the diameter of the crane. He thought that a perfect coking-crane should, if possible, be balanced in all positions, for the engineman to be able to pull it round by hand, and take in a supply of coke without requiring a second man to help; on the same principle as the present large 8-inch water-cranes, which supplied the water with great rapidity without help. This might be accomplished by working the crane round on a level instead of incline, so as to be always balanced, and lifting the coke up previously to the level by other means.

ON THE SCREW PROPELLER.

To the Editor of the Mechanics' Magazine.

SIR,—Need I offer any apology for venturing to disprove some assertions which are put forth (wholly unsupported by argument) in a letter on the screw propeller, by Mr. G. De Penning, published in a recent Number of your Magazine, and which amount to a very novel theory of fluid resistance? I think, perhaps, I need not; at any rate, it appears to me that what is worthy of publication is worthy also of confutation; and as there is an air of *some* plausibility about the dogmas of Mr. De Penning, not from their agreement with any number of facts, but from the omission of all those which contradict his hypotheses, it is well, perhaps, that the errors involved in his letter should be pointed out; though it is somewhat difficult to conceive how a person with *any knowledge* of the matter could overlook them. There is one point, however, which I must guard before commencing to call in question the statements alluded to; that is, I am far from certain that I have arrived at what was *intended* to be conveyed by Mr. De Penning. Whatever be their designed purport, some of his propositions certainly seem lawfully to have no intelligible meaning. If we are to understand his words to imply what they usually mean, I can but conclude that they indicate a maximum amount of ignorance, not only of the subject treated, but also of the first laws of motion and of geometry.

In support of this, I need only instance the following: — "If these blades were turning in vacuo, there being nothing required to take the place of nothing displaced, as there is no pressure on the blades, there could be no reaction, and it would therefore move in it, requiring no other power save that necessary to overcome inertia." Now if this mean anything *à propos* to the matter discussed by the writer, it seems to be this, that if a screw be made to revolve in vacuo as it revolves in water when propelling a ship, that is, *uniformly*, then there will be no force required to keep it moving beside that necessary to overcome inertia! Now, every lad who has read the first principles of dynamics, will tell you (and truly, I shall assume, till Mr. De Penning proves the contrary) that no force at all is necessary to keep a body moving uniformly, either in a straight line or about an axis through its centre of gravity. And, again, who that, knowing the definition of a plane, and had ever seen a screw propeller, would talk about the *planes of its blades?* Or, knowing the signification of the words *slip* and *vacuum*, would speak of a vacuum, "which is the slip"? And there is also another blunder in the letter, which I must mention here, as belonging to those independent of Mr. De Penning's main dogma; namely, that, with a large pitch, the two blades diminish their resultant propelling force by some counteraction between them. I cannot help thinking that, whatever be the pitch, the useful effect of the two similar blades will be just double that of one of them.

This is sufficient, I imagine, to justify a refusal to receive Mr. De Penning's opinion on any point when it is supported by nothing but his authority, much less when it is opposed to received scientific laws, as well as to those of common experience, as I shall endeavour to show the theory of resistance which he gives to be, as he would himself see, if he understood his own opinions.

The whole matter is enunciated (of proof

of course it is incapable) in the following erroneous statement:—"This force, reaction, is nothing more than atmospheric pressure, plus that of the column or depth" (pressure of a depth!!) "of water the propeller may be in, on the surface of its blades acting towards the vacuum on the other side, formed by their changing place in turning;" and the only little piece of truth that I can find in the whole letter, Sir, is buried in the above error; it is, that *some* of the resistance which opposes the motion of a body through a fluid arises from the body being relieved of *part* of the pressure on that side *from* which it moves. That this, however, is the whole of the resistance is to me absurd; or that, for the diminution of the pressure mentioned, a vacuum need be formed, is very unlikely. In works on hydrodynamics I am taught that the pressure on one side of the body is increased, while that on the other is diminished.* Mr. De Penning would have me believe that the pressure is increased on neither side!! but diminished on one of them. I think the books undoubtedly have the best of it, and to decide between the two a very small amount of common sense is necessary.

With your indulgence, Sir, I will attempt to prove the two following little propositions, which will contain, I think, a complete answer to everything new in the opinions under discussion, by establishing what is old enough. The propositions are: I. That the pressure on the positive side of a body moving through a fluid is greater than when the body is at rest.—II. That in the case of an incompressible fluid (like water) no vacuum will be formed on the negative side while the velocity is not above a certain limit depending on the depth of the fluid. For the first, it is enough for me to say, that no body can be put in motion without there being a cause for motion, and this cause of motion, in a body previously at rest, we call force. Now, when a body moves through a fluid it has to set the particles which it meets in motion; so that every particle with which it comes in contact must be acted on by a resultant force in the direction it is made to move in. And this resultant must be the difference of the pressure of the body tending to move the particle in the direction in which it does move, and the pressure of the surrounding particles tending to move it in the opposite direction. The pressure of the body in motion is therefore greater than that of the fluid at rest; that is, it is greater than the pressure on the body when at rest.

The second proposition can be proved by a reference to common every-day experience. Everybody knows that if you take the bung out of a full cask which is standing on one end, the fluid in it will not remain still, but will follow the bung with considerable force, dependent in amount upon the distance of the hole from the top of the cask. Now there is a certain velocity with which the fluid will issue freely from this orifice, proper to the distance just mentioned. If the bung be removed with a velocity greater than this, it will evidently leave the fluid behind and make a vacuum; but if the velocity with which it is removed be not greater than that with which the fluid is capable of issuing from the orifice, then no vacuum will be formed. Carrying this little piece of experience to the theory of resistances, we may say,—If a body be moving through a fluid at any given depth, then, if the velocity with which it is removed from the fluid behind it be not greater than that with which the fluid would issue from an orifice of (nearly) the same size as the section of the moving body and at the given depth, no vacuum will be formed.

This, I think, will give Mr. De Penning some notion that the resistance has nothing at all to do with the formation of a vacuum on the negative side of the screw, paddle, or anything in motion in a fluid. I think, Sir, that before one rushes before the public with new theories, such as that I have been discussing, he ought certainly to possess himself of a *little* knowledge concerning the subjects of them.—I am, Sir, yours, &c.,

J. C.

Deptford, Dec. 18, 1853.

MATHEMATICAL PERIODICALS.

The Northumbrian Mirror.

BY T. T. WILKINSON, F.R.A.S.

(*Continued from page 507.*)

Contents (continued).—The mathematical papers printed in this periodical are mostly of an elementary character, being intended chiefly for the instruction of those who were yet in the rudiments of science. Notwithstanding this, many of these *opuscula* will well repay the attentive perusal of the more advanced student; and at the time they were written they were the more particularly valuable, inasmuch as they placed within the reach of ordinary students a series of familiar illustrations of some of the most important discoveries of modern times. Amongst the more important papers, we may enumerate the following:

I. Horæ Arithmeticæ. By W. Rutherford, of Berwick.

* See "Miller's Hydrostatics and Hydrodynamics."

*** Seven papers, under this head, are to be found in the first and second volumes of the *Mirror*. They contain many ingenious applications of arithmetic to questions which, for the most part, had previously been solved by algebra. The editor judged rightly when he esteemed Mr. Rutherford's "assistance in itself an host."

2. On the Summation of Series. By W. Rutherford.

3. On the Simplification of Irrational Expressions. By W. Rutherford.

4. New Solution to an important Astronomical Problem, with Examples. By W. Rutherford.

Problem.—Two Altitudes of the Sun, and the Times of Observation of these Altitudes being given, to find the latitude and declination.

5. New Solution to a Problem in Heights and Distances. By W. Rutherford.

6. On the Theory and Solution of the Higher Equations. By Mr. Stephen Fenwick, of Newcastle.

*** This paper is devoted to a familiar explanation of Sturm's Theorem, which is illustrated by an example from the Prize Question in the *Ladies' Diary* for 1836.

7. On the Theory and Solution of Equations. By Mr. Fenwick.

*** This paper contains a historical dissertation on the History of the Numerical Solution of Equations, and is followed by several well-selected examples of the use of Horner's process.

8. New Demonstration of Lagrange's Theorem. By Mr. Thomas Tate, of York.

9. The Modern Geometry, reprinted from the *Student*.

*** In successive Numbers, the whole of the sixty-two propositions are reprinted, and several useful and elegant deductions occur among the regular mathematical questions. The subject is well worthy of reconsideration, and may, at some future opportunity, form the subject of a series of special essays. The Prize Question in the *Diary* for 1854 belongs to a neglected branch of this inquiry.

10. Horner's Process Applied to Cubics; whence the "new Rule for the Extraction of the Cube Root," as given by Mr. Rutherford. By Mr. S. Fenwick.

11. Remarks on the Relative Merits of the Methods of Sturm and Horner. By Mr. T. Tate.

12. On the Differential Calculus. By Mr. S. Fenwick.

13. On the Mathematical Construction of the Oblique Arch. By Mr. Thomas Tate.

14. On the Differential Calculus. By Mr. S. Fenwick.

15. The Transformation of Functions and the Numerical Solution of Equations By Mr. Robert Kipping, of Newcastle.

16. On Maxima and Minima. By Mr. S. Fenwick.

17. On Loci by means of the Differential Calculus. By Mr. S. Fenwick.

18. Transformation of Functions of Binomial Factors. By Mr. R. Kipping.

19. On the Integral Calculus. By Mr. S. Fenwick.

20. Hints on the Resolution of the Higher Equations, by means of Budan's Criterion. By Mr. W. Rutherford, F.R.A.S., Royal Military Academy, Woolwich.

*** In a second paper on this subject, Mr. Rutherford further illustrates the value of Budan's criterion by a selection of examples from Professor Young's *Mathematical Dissertations*, in which "it will be found that the Criterion of Budan requires a much less amount of labour than that of Sturm."

Questions.—The total number of mathematical questions proposed in this periodical is 225, of which 210 received answers. They relate to almost every subject in pure and applied mathematics, amongst which those relating to geometry bear a considerable proportion. Many interesting properties of plane triangles occur at intervals, and considerable elegance is displayed in many of the solutions. Prizes were awarded for the best solutions of the Enigmas, Questions, &c., in each number, and many well-known names occur as the recipients of these stimulating encouragements.

In one of the earlier numbers the Editors complain that hints have reached them to the effect "that all the solutions sent are not the *bonâ fide* productions of their assumed authors," and such in reality appears to have been the case. The *Northumbrian Mirror*, however, is not the only serial in which such practices have been resorted to by unprincipled correspondents. The prize in one of our most valued annual publications has recently been awarded to a Lancashire gentleman, whose solutions are well known to have been furnished to him by a friend at Cambridge. Such practices deserve severe reprobation, for, if persisted in for any length of time, they must inevitably damage the reputation of the periodical, and lead to a general distrust of those contributors whose solutions are their own genuine productions. No blame whatever can attach to the Editor of such works, for they can only judge of the abilities of correspondents from the solutions sent; and if such deceptions be practised, those who degrade themselves by adopting such unworth means "must lose all consciousness before they can rejoice in the success of any falsehood without inward mortification."

Contributors.—Armstrong, Aspden, Davies, Dobson, P. Elliott, J. W. Elliott, Emerson, Ferguson, Finlay, Forsyth, Garstang, Gourley, Greenup, Gregson, Grey, Harrop, Harrison, Hindle, Huntington, Johnson, Kipping, Mawson, Oxenford, Pickering, Robinson, Richardson, Rutherford, Tate, Taylor, Temple, Tomlinson, Weddle, Woolhouse, Wilkinson, Winward, Young, &c., &c., &c.

Publication.—The publication was at first quarterly; afterwards each Number appeared in intervals of four months, and the last two or three Numbers were issued half-yearly. Most of the work was printed at Alnwick, by M. Smith, and the New Series by Messrs. Selkirk, Newcastle.

SPECIFICATIONS OF PATENTS RECENTLY FILED.

Joseph H. Penny, and Thomas B. Rogers, of New York, America. *A new and useful improvement in the manner of constructing machinery for propelling vessels, and other machinery, which they term a crank propeller.* Patent dated June 14, 1853. (No. 1439.)

Claims.—1. The peculiar construction of the several sets and series of paddles made as described, and the combination, in these series, of the paddles, connecting-rods, and connecting-heads with each other, and with the cranks, or eccentrics, as described.

2. A peculiar construction of the connecting-heads and arms, by which the connecting-head serves the double purpose of a paddle, and of a support for the connecting-rods and paddles.

3. The peculiar construction of the valve-paddle, as described.

4. The peculiar construction of the anti-friction eccentric made as set forth, and whether used in connection with the propeller, or separately.

5. The combining, as substantially before set forth, of the eccentric with the series of paddles.

John Henry Johnson, of Lincoln's-inn Fields, Middlesex, gentleman. *Improvements in railway breaks.* A communication from Francis A. Stevens, of Burlington Vermont, United States. Patent dated June 14, 1853. (No. 1440.)

Claims.—1. The general arrangement described.

2. The mode of constructing wheel-break apparatus, wherein the actuating movement is propagated by levers and link-rods throughout the entire apparatus on a single carriage, or throughout the series of break apparatuses on an entire train of carriages, as described.

3. The mode of constructing wheel-break apparatus, wherein the frictional pressure of each break against the periphery of the wheel is obtained by the re-actionary resistance of the breaks of the adjacent wheels, communicated through a system of levers as described.

Thomas Richardson, of Newcastle-upon-Tyne, manufacturer. *Improvements in the manufacture of certain salts of magnesia, and a red colouring matter.* Patent dated June 14, 1853. (No. 1441.)

Claim.—The use of fluor-spar and sulphate of iron for making a red colouring matter, either alone or in connection with the preparation of pure sulphate of magnesia.

Joseph Leon Talabot, of Chaussée d'Autin, Paris, and John Davie Morries Stirling, of the Larches, near Birmingham. *Improvements in the manufacture of iron.* Patent dated June 14, 1853. (No. 1442.)

A description of this invention will shorty be given.

Alfred Vincent Newton, of Chancery-lane, Middlesex, mechanical draughtsman. *An improved mode of manufacturing cast steel.* (A communication.) Patent dated June 14, 1853. (No. 1443.)

Claim.—The reduction of blistered steel to a molten state by the process explained, whether effected by the aid of two furnaces, retained at different degrees of heat, or by other analogous means.

Arthur Parsey, of Crescent-place, Burton-crescent, St. Pancras, Middlesex. *A revolving engine, to be worked by steam, air, gases, or water.* Patent dated June 15, 1853. (No. 1445.)

The inventor describes and claims a method of constructing a revolving engine, in which the piston is a cylinder of a less diameter than the containing cylinder, and is mounted eccentrically. There are four plates centred at their extremities on to the containing-cylinder, and sliding in slots or grooves formed in the piston. The steam-ports are on opposites of one of these plates, this plate and the two adjacent ones being severally connected by springs to the piston at the inner parts of the grooves. The springs are for the purpose of drawing the piston back when the pressure of the steam is taken off.

Thomas Butterworth, of Meanwood, Yorkshire, gentleman. *A machine for ploughing land, harrowing, and crushing clods, at one operation.* Patent dated June 15, 1853. (No. 1446.)

The inventor describes and claims a combination of machinery for successively effecting the operations described in the title, and also a harrow of a peculiar construction,

which acts so as to leave the weeds upon the surface.

Charles Wye Williams, of Liverpool, Lancaster, gentleman. *Improvements in the manufacture of sheet iron, and of iron plates used for boilers, vessels, buildings, and other like purposes.* Patent dated June 15, 1853. (No. 1449.)

This invention relates to a peculiar mode of manufacturing wrought-iron sheets and boiler-plates, so that they shall present a series of ribs or ridges on one or both sides, by which means their strength is increased, and when used in the construction of boilers, with their ribbed sides exposed to the fire, they present an enlarged heating surface.

The inventor claims the above method of manufacturing iron.

John Macintosh, of Pall-mall East, Middlesex, C.E. *Improvements in the construction of portable buoys, or vessels and buoys.* Patent dated June 15, 1853. (No. 1450.)

This invention consists of constructing boats, hollow vessels, and buoys of water-proof fabric, and in giving form thereto when required for use by means of ribs of wood or metal. In forming a boat, several of such ribs are used, of such a length as to run from stem to stern; and being there attached together, they will, in their ordinary state, be parallel, and, with the water-proof fabric, lie and pack close; but when the two ends of each rib are drawn towards each other by a screw, or by other means, it will bend into the form of a bow, and by so doing will give the desired shape to the boat. In a similar way, a buoy or like form of vessel intended to float in the water, may be formed.

Jules Dehau, of Rue Pigale, Paris. *Improvements in the manufacture of yarn, and fabricating articles therefrom.* Patent dated June 15, 1853. (No. 1451.)

Claim.—"The application of the fibre of the plant called Lygeum Spartum in the manufacture of yarn, and fabricating articles therefrom."

Jules Dehau, of Rue Pigale, Paris. *Improvements in the manufacture of woven fabrics, yarn, cordage, rope, paper, and pasteboard, by the application of a material not hitherto used in Great Britain for such purposes.* Patent dated June 15, 1853. (No. 1452.)

Claim.—"The application of the fibres of the *styra tenacissinia* in the manufacture of woven fabrics, yarn, cordage, ropes, paper, and pasteboard."

James Dilkes, and Edward Turner, of Leicester. *Improvements in door-springs.* Patent dated June 15, 1853. (No. 1453.)

This invention consists in employing helical springs made of iron wire, or of brass or steel, in combination with inclined surfaces, which are moved by the act of opening the doors (to which such apparatus may be applied), by means of levers or instruments attached to the doors, having each a roller or rollers which move against the inclined surfaces; the movement of the inclined surfaces causes the springs to be extended or moved from their quiescent positions. The effort of the springs will thus at all times have a tendency to shut the doors, and also to keep them closed, though the doors may at pleasure be retained open.

William Gossage, of Widnes, Lancaster, manufacturing chemist. *Improvements in obtaining certain saline compounds from solutions containing such compounds.* Patent dated June 15, 1853. (No. 1455.)

Claim.—An arrangement of apparatus for obtaining saline compounds of soda from solutions produced by the lixiviation of soda ash or black ash, and sulphate of soda from solutions containing such compounds of soda; which arrangement of apparatus provides for such compounds being deposited from hot saturated solutions containing the same, by cooling such solutions in a pan or vessel which is so connected with the pan or pans employed for heating and concentrating them, that a continuous flow of them can be maintained through the same. Further, the passing of streams of air through such hot solutions, contained in such cooling pans or vessels, for the purpose of cooling the same, and causing evaporation of water therefrom.

John Elliott, of Oak-lane, Limehouse, Middlesex, engineer, and John Brown, of the same place, engineer. *Improved machinery for making rivets, spikes, and screw blanks.* Patent dated June 15, 1853. (No. 1456.)

Claims.—1. The ring of segment pieces for carrying the rotating dies, and permitting the thrust of the plunging die being received by a stationary block or frame, which also sustains the ring of segment pieces in its required position.

2. The arrangement of parts described for rotating the ring of segment pieces, and bringing the dies consecutively under the plunger, and for effecting the discharge of the rivets, spikes, or screw-blanks from the dies.

3. Adjusting the rotating dies to the required position for receiving the pressure of the plunger, by the descent of the die into the openings in the segment pieces.

4. The jointed trough or guide for conducting the lengths of wire as they leave the cutters into the rotating dies.

5. The general arrangement of parts constituting the improved machine, as described.

TIMOLEON ZOE LOUIS MAURER, of Paris, France. *Certain improvements in horological alarms.* Patent dated June 16, 1853. (No. 1457.)

The inventor describes an alarm, with a time-piece in connection, and claims—1, an arrangement of hinged covers, one of which bears a bell, while the other supports the watch; 2, a mode of establishing a connection between the alarm and watch by means of a slide-rod; 3, an arrangement of the bell upon the hinged cover, and a peculiar mode of sounding it; 4, a mode of setting the alarm to the time, and of arranging it for sounding; 5, a peculiar escapement.

WILLIAM BADDELEY, of Angel-terrace, Islington, Middlesex, engineer. *An improved label-damper.* Patent dated June 16, 1853. (No. 1458.)

Claim.—The construction of a rotary label-damper, whereby the label is wetted on both sides, either by passing down through water, or between the surfaces of wetted rollers.

EDWARD WALMSLEY, of Heaton Norris, Lancaster, spinner, and JOHN HOLMES, of Manchester, Lancaster, engineer. *Improvements in, and applicable to, steam-engines.* Patent dated June 16, 1853. (No. 1459.)

Claims.—1. The application of slot-levers, and parts acting in combination therewith, for regulating the speed of steam-engines, as described. 2. A combination of machinery for connecting and disconnecting the governor and the valve-rod. 3. Moving the valve-rod stud in a slotted disc for regulating the speed of steam-engines.

WILLIAM CHRISTOPHER, of Euston-square, and GUSTAVUS GIDLAY, of Robert-street, Hoxton. *Improvements in abstracting sulphur and other matters from vulcanized India-rubber.* Patent dated June 16, 1853. (No. 1461.)

This invention consists in macerating the vulcanized India-rubber in a hot solution of carbonated alkali, or in a solution of hydrate of lime, or in hot water in which caustic lime is suspended, till, through the action of the alkali or of the lime, the requisite quantity of sulphur is abstracted; that is, till enough sulphur is withdrawn to reduce the relative proportions of the sulphur and the caoutchouc to those required for any special purpose, or till the sulphur is so far removed as to leave the residual material in a condition to be acted on by the usual solvents or softeners of caoutchouc, so as to fit it for being again manufactured into articles, and for being re-vulcanized with sulphur, or another material, if required.

JOHN BLAIR, of the firm of John Blair and Co., New Milns, Ayrshire, Scotland, cutters. *A new and improved mode of cutting lappet cloths or other similar fabrics.* Patent dated June 16, 1853. (No. 1462.)

Claim.—The cutting or ripping of the "whoop threads," so as to cause them to be turned up as they pass over the ordinary bed underneath the ordinary cutters or shavers.

JAMES WILLIAM GIBSON, of Long-acre, St. Martin's-in-the-fields, London. *A new method of pavement, tending to secure the evenness of the road and proper adhesion to the foot.* Patent dated June 16, 1853. (No. 1463.)

The inventor describes and claims a method of forming pavement having an iron foundation, an under drainage, and a permanent groove of a peculiar construction.

JULES ALEXIS ADRIEN DUMOULIN, of Paris, France. *An improved instrument for measuring and tracing.* Patent dated June 16, 1853. (No. 1464.)

Claims.—1. A pendulum, or any other similar appendage, suspended from a fixed axis, and acting by means of levers on pulleys bearing tangentially against discs, so as always to keep the pulleys at certain distances from the centres of their respective discs, which distances are proportional to the sine and cosine respectively of the angle made by the pendulum, with the plane passing through the centres of the discs.

2. A peculiar method of taking up the first motion given to the discs by means of pulleys which transmit the motion and modify it, so as to represent, by lines or by an index, the sines and cosines of the angles made by the pendulum.

JOSEPH ILSLEY, of Lisbon, Portugal, professor of physics. *Improved telegraphic apparatus.* Patent dated June 16, 1853. (No. 1466.)

Claim.—Causing a needle or index-hand to move or vibrate on its centre, by means of a column of air alternately rarefied or compressed (or *vice versâ*), by a piston or other suitable contrivance; such column of air being made to act upon a thin flexible plate or diaphragm, a collapsible tube, or other equivalent means connected with the shaft or spindle of the said index, hand or needle.

PETER ARMAND LECOMTE DE FONTAINE-MOREAU, of Rue de l'Echiquier, Paris. *An improved process for preserving milk, and its application to several organic products and alimentary substances.* (A communication.) Patent dated June 16, 1853. (No. 1467.)

In operating upon milk the inventor exhausts the air it contains, by using a tube which is filled with milk and put in communication with a reservoir, containing a convenient quantity of that liquid, and

covered with a layer of oil, to preserve its exposed surface from contact with the atmospheric air.

Peter Armand Lecomte de Fontainemoreau, of Rue de l'Echiquier, Paris. *Improvements in the preparation of certain vegetable and alimentary substances.* Patent dated June 16, 1853. (No. 1468.)

Claims.—1. An improved method of, and apparatus for, extracting and concentrating the juice of certain plants, and preparing thereby a liquid applicable to improving and cheapening coffee infusions.

2. The combination of the juices so obtained with the extract of dried fruits, gum, or other vegetable substances, for the preparation of a new liquid or solid alimentary product.

Clinton Roosevelt, of New York, United States. *Reducing the friction of the journals of railway and other carriages, which is also applicable to the journals of machinery.* Patent dated June 16, 1853. (No. 1469.)

Claim.—A double row of rollers arranged and combined in the manner described.

Benjamin Finch, of Seville-works, Dublin, engineer. *Improvements in apparatus for supplying water to steam-boilers.* Patent dated June 16, 1853. (No. 1471.)

This invention consists in supplying steam boilers, by a combination of apparatus, in which a force-pump, worked by the engine, forces a supply of water into a valve-chest, and from this chest the requisite quantity is supplied to the boiler, on the interior of which a float gives motion to a lever, which, by a rod (passing through a stuffing-box), gives motion to a weighted spindle, on which are two valves, one opening into, and the other out of, a water passage leading to the boiler; so that the two valves will regulate the quantity of water which will pass from the valve-chest in the water-passage, and the opening of the valves will depend on the rising and falling of the float in the boiler. In the water-passage is a cock, by which the water can be supplied from a supply-tank, or street-main, by suitably turning the plug of the cock.

Joseph Warren, of Maldon, Essex, iron founder. *Improvements in ploughs.* Patent dated June 16, 1853. (No. 1472.)

This invention consists of a combination of apparatus applied to a plough, for the purpose of varying the depths and positions of parts thereof. The sole and shear are connected at their fore ends to a cranked lever, which moves on an axis fixed to the beam of the plough, and the back end of this lever is connected by a link to a hand-lever moving on an axis attached to the handle at the back end of the beam, so that the cranked lever can be raised and lowered, and set fast in any desired position by a set screw. The back end of the mould-board is attached by a stay to the sole and to the beam, and there is a socket fixed to the sole for guiding the cranked lever in its movement up and down.

Solomon Solomon, of Aldgate, and Samuel Mills, of St. George's-in-the-East, Middlesex. *Improvements in axle-boxes for locomotive engines, railway, and other carriages applicable to the bearings of machinery.* Patent dated June 16, 1853. (No. 1473.)

Claim.—The construction of axle-boxes for carriages, and bearings for machinery, with grooves or recesses, so that one or more series of friction-rollers placed therein shall travel round an axle or shaft, in order to reduce the friction, and at the same time form the bearing of the shaft or axle-journal.

Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, London. *Improvements in machinery for pulverizing and washing quartz or ore, and for amalgamating the gold contained therein.* Patent dated June 17, 1853. (No. 1476.)

Claims.—1. The employment for the purpose of pulverizing quartz or ore, or any mineral matter containing gold or other metal, of a spherical ball within a circular basin, whose axis moves so as to describe the periphery of a cone, but which does not revolve, the motion being produced by any mechanical means equivalent to those described.

2. The combination, with a crushing or pulverizing basin, moving as described, of an amalgamating basin, having the same axis, and moving with it, and having communication with it through a screened opening in the centre.

3. Connecting the shaft which forms the axis of the basins to the driving-shaft by means of a crank, whose length is capable of being varied by the increasing or decreasing centrifugal force acquired by the ball, but which is regulated, when the crank is not otherwise unduly influenced, by springs placed on either side of one of its connections.

Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, London. *An improved stove or kiln.* Patent dated June 17, 1853. (No. 1477.)

The patentee's improvement consists in forming apparatus which is constructed so as to bring such substances as bricks, tiles, &c., from the cold state to a complete baking, and vice versâ, without any sudden transition.

Claim.—Certain described continuous kilns or furnaces and drying stoves, applied either singly or conjointly.

Robert Lister, of Scotswood, Northumberland, brickmaker. *Improvements in chimney-tops or flues.* Patent dated June 17, 1853. (No. 1478.)

Claims.—1. The application and use in chimney-pots and flues of external air-tubes or passages for improving the flue currents.

2. The mode of constructing chimney-tops and flues with tubes or passages forming communications between the open external atmosphere surrounding the chimney-top and the interior of the upper portion of such top.

3. The mode of constructing chimney-tops and flues with an external annular passage.

Henry Bleasdale and Joseph Bleasdale, of Chipping, Lancaster. *Improvements in working, tilling, or preparing land.* Patent dated June 17, 1853. (No. 1479.)

Claims.—1. An arrangement and construction of digging or soil-loosening implements, made so as to be self-clearing.

2. The use of revolving spikes or arms for removing roots, weeds, or other deposits from the arms or spikes of the diggers.

3. A peculiar arrangement of gearing, with containing-boxes for actuating the clearer, as described.

James Hogg, junior, of Nicolson-street, Edinburgh, publisher. *Improvements in the application and combination of glass, porcelain, stoneware, earthenware, terra cotta, composition in plaster, of the kind called scagliola, and majolica ware.* Patent dated June 17, 1853. (No. 1480.)

Claim.—The application of the above known plastic substances or preparations to the manufacture of various parts of certain articles enumerated.

John Piddington, of Brussels, Belgium, gentleman. *Improvements in obtaining infusions and decoctions, and in vessels or apparatus employed therein.* (A communication.) Patent dated June 17, 1853. (No. 1481.)

Claims.—1. The obtaining of decoctions or infusions by causing water or other liquid to circulate continuously through the matters from which decoctions or infusions are to be made, as described.

2. The construction and arrangement of certain described vessels or apparatus for obtaining decoctions and infusions by continuous circulation.

William Hall, of Aberdeen. *Improvements in shipbuilding.* Patent dated June 18, 1853. (No. 1482.)

Claim.—The employment of wood-screw treenails for shipbuilding purposes.

Henry Bessemer, of Baxter-house, Old St. Pancras-road, Middlesex. *Improvements in the manufacture of waterproof, or partially waterproof fabrics.* Patent dated June 18, 1853. (No. 1483.)

This invention consists in coating cotton and other yarn or thread, previous to weaving the same into a fabric, with a waterproofing solution, preferring for such purpose a solution containing India-rubber, or resinous gums not soluble in water.

Henry Saunders, of Yeovany, Staines. *Improvements in drying grass and other crops.* Patent dated June 18, 1853. (No. 1484.)

This invention consists in causing grass, corn, and other crops, to be artificially dried, by being carried immediately after they are cut to the drying apparatus, which consists of an enclosed chamber, into and through which warmed or dry air can be forced, or otherwise caused to pass, and to act on, and evaporate the moisture contained in the grass or other crop.

Edgar Breffit, of Castleford, York, glass-manufacturer. *Improvements in the manufacture of glass-house pots.* Patent dated June 18, 1853. (No. 1486.)

Claim.—The manufacture of glass-house pots, by constructing the same upon a base consisting of an external ring, surrounding an internal or central portion, which is afterwards removed to allow of the access of air to the bottom of the pot.

Jacques Francois Dupont de Bussac, of Upper Charlotte-street, Fitzroy-square, Middlesex, gentleman. *An improved mode of making with iodine and its compounds, in combination with substances containing extractive principles, various elementary combinations.* Patent dated June 18, 1853. (No. 1487.)

Claims.—1. "The production of an iodhydric acid, pure and stable," by certain described processes.—2. The production of certain different iodhydrates, or biniodhydrates.—3. The production of iodhydrated oils, as described.—4. The production of iodhydric powder of cinchona, as described.—5. The manufacture, by the aid of iodhydric acid, majendie, or of the different iodhydrates, or biniodhydrates described, of medicines of all kinds in which iodine is necessary.

Thomas Adamson, and William Adamson, of Sunderland, Durham. *Improvements in pumps.* Patent dated June 18, 1853. (No. 1488.)

Claim.—The use and employment of a three-throw crank, and a cranked shaft, and the connecting thereof direct with the buckets, or spear boxes of pumps, for the purpose of imparting reciprocating motion thereto.

James Heginbottom, and Joseph Heginbottom, of Ovenden, Halifax, York, cotton-spinners. *Improvements in spinning.* Patent dated June 18, 1853. (No. 1489.)

Claim.—The method of communicating a gradually increased speed to the spindles of the spinning mule, whilst the carriage is in motion, as described, or any modification thereof.

JAMES SHANKS, of St. Helen's, Lancaster, manufacturing chemist. *Improvements in the manufacture of alkali from common salt.* Patent dated June 18, 1853. (No. 1490.)

Claim. — The production of sulphate of soda (to be used in the manufacture of alkali) by exposing a mixture of common salt and "alkali waste," together with small coal (made into balls or masses), to the action of atmospheric air or heat in kilns, by means of arrangements which provide for the proper application of heat and of atmospheric air to such balls or masses.

JAMES WORRALL, junior, of Salford, Lancaster, dyer and finisher. *Certain improvements in machinery or apparatus for washing, bleaching, and dyeing fustians, beaverteens, cantoons, satteens, twills, and other textile fabrics.* Patent dated June 18, 1853. (No. 1493.)

Claim.—1. The passing the cloth, well saturated with water, bleaching liquor, or dye, through a system of cowls or cylinders, and particularly the use of guide or separating rollers, by means of which the cloth is detached at intervals from the main bowl.

2. Employing perforated or other pipes for the purpose of forcing water, bleaching liquor, or dying liquor, at a high pressure, on to and into the cloth at the point where it becomes detached or separated from the main bowl.

JOHN CROSS RICHARDSON, of Lilly-hall, near Manchester, Lancaster, manufacturer. *Certain improvements in machinery or apparatus for winding yarn.* Patent dated June 18, 1853. (No. 1494.)

The inventor claims the application of conical drums to equalize the speed of the yarn or thread when being taken up or wound on to the bobbins, and the use of conical "pressers," in which the bobbins revolve.

JOHN CROSS RICHARDSON, of Lilly-hall, near Manchester, Lancaster, manufacturer. *Certain improvements in looms for weaving.* Patent dated June 18, 1853. (No. 1495.)

Claim. — The giving to the disc which drives the star-wheel an intermittent motion, and the constructing a disc, either made solid and according to the pattern required or composed of moveable segments, one or more of which has or have a stud or studs, as required, at its circumference, in order to change the section of the endless pattern chain.

GEORGE ROBINSON, of the firm of Binyons, Robinson, and Co., of Manchester, Lancaster, tea and coffee merchant. *Certain improvements in apparatus for roasting and desiccating coffee, cocoa, and chicory.* Patent dated June 18, 1853. (No. 1496.)

Claim —The application, employment, or use of cylinders or chambers constructed of wire, wire cloth, or wire gauze, for roasting or desiccating coffee, cocoa, or chicory.

SAMUEL SCHOFIELD, of Oldham, Lancaster, cotton spinner. *Certain improvements in machinery or apparatus for preparing and spinning cotton and other fibrous materials.* Patent dated June 18, 1853. (No. 1497.)

Claim.—The application, employment, or use of the well-known bosses or rollers called "clearers," constituting parts of machinery or apparatus for preparing and spinning cotton and other fibrous materials placed above the centre of the axis of the "first drawing roller," and revolving in contact with the first top or front drawing roller alone.

GEORGE YOUNG, of Neath, South Wales, merchant. *Improvements in grinding wheat and other grain.* Patent dated June 18, 1853. (No. 1498.)

This invention consists of a peculiar arrangement of apparatus for ventilating millstones. A double tube is fixed in the eye of the upper millstone, and on the upper end of this tube are fixed trumpet-mouthed blowers, which by the rotation of the stone, drive air into the double tube and cause it to pass between the grinding surfaces. And in order that the air may not pass back, a conical leather or other packing is applied to the upper end of the double tube through and within which the supply-pipe passes and rotates.

CHARLES CRICKMAY, of Handsworth, Stafford, gun manufacturer. *Improvements in the manufacture of fire-arms.* Patent dated June 20, 1853. (No. 1499.)

This invention relates, firstly, to a peculiar mode or modes of constructing gun-breeches to facilitate the loading thereat, the same being applicable to every description of fire-arms. Secondly, an arrangement of the cock-trigger and parts connected therewith, which is intended to produce a central discharge by a percussion-tube attached to the cartridge; but in some instances the ordinary percussion-cap and nipple are employed. And, thirdly, to the forming of a chamber in the thick part of the gun-stock for the reception of a convenient number of cartridges to be used as a reserve.

JOHN PAUL, paper-stainer, of Manchester, Lancaster. *Colouring paper on the surface.* Patent dated June 20, 1853. (No. 1500.)

In Mr. Paul's apparatus there is a trough containing the colour, with arrangements

for heating the same, a tap for bringing the colour on to the paper and for regulating the supply, and an agitator traversing along its inner surface; the colour is spread by means of one or more brushes having a compound rotary and traverse motion by a right and left-hand cut screw, rack, and pinion; the paper, when thus coloured, is finished and smoothed off by means of two or more brushes, having a compound eccentric and traverse motion from a crank, and the aforesaid screw and rotary motion from a centre on the crank. The table is carried forward by a movement attached to the framework, with an endless blanket.

ROBERT MIDGLEY, of Northowram, Halifax, York, worsted spinner. *Improvements in preparing and finishing certain worsted yarns, and in apparatus employed therein.* Patent dated June 20, 1853. (No. 1501.)

Claims.—1. A method of making and connecting the singe-plate in two or more parts. 2. A method of setting the yarn by steam in a cylinder whilst on the reel. 3. A method of drying the yarn in the cylinder, by means of heated air drawn through the cylinder by an air-pump.

HIRAM BARKER, of Manchester, Lancaster, engineer and tool maker, and FRANCIS HOLT, of Manchester, engineer. *Improvements in machinery or apparatus for grinding and turning metals.* Patent dated June 20, 1853. (No. 1502.)

This invention consists of improved combinations of parts: 1, for grinding metal balls to make them spherical, consisting of a grooved metal dish and cover, between which the balls are placed, rotary motion being communicated to the cover; and 2, for giving a reciprocating motion to the face-plate of a turning-lathe; also in forming an improved mandril, or tool, on which articles to be turned are fixed, and in combining machinery for turning articles of a definite shape.

COMPLETE SPECIFICATIONS FILED WITH APPLICATIONS.

LOUIS ALEXANDRE MICHEL, merchant, of Paris, France. *A system of apparatus for sawing and breaking sugar.* Patent dated November 29, 1853. (No. 2777.)

The inventor describes and claims certain machines (or any mere modifications of them), the object of which are, first, to divide sugar-loaves into layers, and then to break the layers into pieces of uniform size, shape, and weight.

CHARLES WILLIAM HOCKADAY, of Port Hall, Brighton, Sussex, gentleman. *Certain chemical compound or compounds, applicable as a remedy, or remedies, for scorbutic and other affections of the human body.* Patent dated December 5, 1853. (No. 2819.)

The inventor says, "First I use for the complaint, commonly known as scurvy, the following proportions of hyd: oxymur five grains, acid muriat fifteen grains; vini antimonii, half ounce; aqua dist, two drachms; sacch ust, q. s. For an adult I consider that twenty drops in a wine-glass of water, and taken twice a day, to be proper and sufficient."

JOHN MOLD, of Portland-terrace, Westmoreland-road, Walworth, Surrey. *Improvement or addition to augment convenience, by transformation and facility, the different lines required in the erection or manufacturing edifices or structures, by apparatus, tools or instruments, suitable for the different capacities of operatives and general surveying.* Patent dated December 6, 1853. (2830.)

The specification of this invention is as incomprehensible as its title.

PROVISIONAL PROTECTIONS.

Dated October 5, 1853.

2274. William Crofts, of Derby-terrace, Nottingham-park, manufacturer. Improvements in the production of figuring in weaving.

Dated October 6, 1853.

2290. Charles Augustus Holm, of Cecil-street, Middlesex, civil engineer. Improvements in machinery for raising or propelling elastic and non-elastic fluids.

Dated October 19, 1853.

2406. Gustavus Sidley, of Robert-street, Hoxton, Middlesex, and John Bell Muschamp, of Claremont House, Kensington, in said county. An improvement in making India-rubber solution for waterproofing cloths or other articles, without the offensive smell produced by the use of naptha, turpentine, oils, &c.

Dated October 24, 1853.

2452. Edward John Montagu Archdeacon, of Gravel-lane, Southwark. An improved method of indicating places, divisions, or contents, in directories.

Dated October 27, 1853.

2486. George Edward Dering, of Lockleys, Hertford. Improvements in galvanic batteries.

Dated November 21, 1853.

2706. William Joyce, of Greenwich, Kent, engineer, and Thomas Meacham, of the same place, engineer. Certain improvements in marine steam engines.

Dated November 22, 1853.

2710. William Moe, of Leicester, manufacturer. Improvements in the manufacture of braces.

Dated December 3, 1853.

2813. Charles Edmund Green, of Blandford-street, Portman-square, London, merchant, and John Bayliss, of Parliament-street, Westminster, civil engineer. Improvements in machinery to save persons and property in case of fire, which machinery may also be applied for the purpose of raising and lowering weights of any kind, also for the purpose of compression, and for other useful purposes.

2815. Charles Buck, of Wellington, Somerset-

shire, gentleman. An improved apparatus for retarding or stopping the progress of wheel carriages.

2817. John Gwynne and James Egleson Anderson Gwynne, of Essex Wharf, Strand, Middlesex. Improvements in the manufacture of fuel, its preparation and applications for the reduction of ores, fusing and refining metals, cementation or making steel, and treating salts. Partly a communication.

Dated December 5, 1853.

2821. Benjamin Skillman, of Crosby-hall-chambers, London, mining agent. An improved mode of preparing sheets of paper suitable for postal communication.

2823. Matthew Andrew Muir, of Glasgow, Lanark, machinist. Improvements in check and fancy weaving.

2825. Thomas Storey, of the Phœnix Foundry, Lancaster, engineer. Improvements in the construction and arrangement of apparatus employed in connection with sewers.

Dated December 6, 1853.

2829. John Coope Haddan, of Chelsea, Middlesex, civil engineer. Improvements in the manufacture of cartridges and of wads or wadding for fire-arms.

2831. Auguste Edouard Loradoux Bellford, of Castle-street, London. The manufacture of an artificial tartaric acid, and the application of the same to useful purposes. A communication.

2833. Thomas Mills, of Leicester. An improvement in the manufacture of lined gloves.

2835. Robert Christopher Witty, of Portland-place, Wandsworth-road, Surrey, engineer. Improvements in the construction of boiler and other furnaces.

2837. Julien Bernard, of Regent-street, Middlesex, gentleman. Improvements in machinery or apparatus for stitching or uniting and ornamenting various materials.

2839. Alfred Vincent Newton, of Chancery-lane, mechanical draughtsman. Improvements in fire-arms and ordnance. A communication.

Dated December 7, 1853.

2840. William Slater and Robert Halliwell, both of Bolton-le-Moors, Lancaster, foremen. Improvements in machinery for spinning.

2841. Lewis Harvey Bates, of Bradford, York, engineer. Improvements in machinery for stamping and cutting metal nuts and other similar metal articles.

2843. John Getty, of Liverpool, Lancaster, ship builder. Improvements applicable to the plating of iron ships, part of which improvements is also applicable to the construction of boilers.

Dated December 8, 1853.

2844. William George Reeve, of Elizabeth-street, Eaton-square, Middlesex, veterinary surgeon. An appendage to horse shoes, to supersede the necessity of roughing them, as hitherto practised.

2845. William Bridges Adams, of Adam-street, Adelphi, Middlesex, engineer. Improvements in railway wheels, their axles and boxes.

2846. William Thomas Henley, of St. John-street-road, electrical engineer. Improvements in electric telegraphs.

2848. Benjamin Solomons, of Albemarle-street, Piccadilly, Middlesex, optician. Improvements in telescopes and other glasses in their application to the measurement of distance.

2849. William Chickall Jay, of Regent-street, Middlesex. An improved cloak.

2850. Joseph Goddard and Charles Yates, both of Tottenham Court-road. Certain improvements in machinery or apparatus for obtaining and applying motive power

2851. Joseph Robinson, of Denton Mill, Carlisle. Improvements in mills for grinding corn and other substances,

2852. John Nelson, of Selby, York, and David Boyd, of the same place. Improvements in scutching flax and hemp.

2853. James Beall, of Effingham-place, Cheshunt, Herts. Improvements in apparatus for applying sand to the rails of railways.

2854. William Edward Newton, of Chancery-lane, Middlesex, civil engineer. Improved machinery for drilling or boring rocks and other hard substances. A communication.

2855. Philippe Joseph Toussaint Bordone, medical doctor, of Paris. Improvements in extracting and treating the juice of beetroot and other vegetables.

2856. Marcel Gustave Laverdet, of Paris, France, artist. An improved mode of treating photographic pictures.

2857. Benjamin Murgatroyd, of Bradford, York, dyer. Improvements in washing or scouring wool and fabrics composed entirely or partly of that material.

Dated December 9, 1853.

2860. Arthur James, of Redditch, Worcester, manufacturer. Improvements in counting, measuring, and weighing needles, and in preparing papers to receive the same.

2861. Duncan Christie, of Bromley High-street, Bromley, Middlesex, engineer, and John Cullen, of Bromley High-street, Bromley, Middlesex, engineer. An atmospheric counterbalance slide-valve for the steam engine, hydraulic, and all other machines in which the slide-valve is used or required.

2862. Andrew Shanks, engineer, of Robert-street, Adelphi, Westminster, Middlesex. Improvements in instruments and apparatus for indicating or measuring weights and pressures.

2863. Charles Mackenzie, of Bayswater, Middlesex, esquire, and Alexander Turnbull, of Manchester-square, Middlesex, doctor of medicine. Machinery for paring fruit and vegetables. A communication.

2864. John Winspear, of Liverpool, Lancaster, civil engineer. An improved mode of coating metals, wood, stone, and plaster, to preserve them from decay.

2865. Richard Eccles, of Wigan, Lancaster, spinner, John Mason, of Rochdale, said county, machinist, and Leonard Kaberry, of Rochdale aforesaid, manager. Improvements in slubbing and roving frames for cotton and other fibrous substances.

2866. James Sutcliffe, of Manchester, Lancaster, machinist. Improvements in steam engines and in apparatus connected therewith.

2867. Frederick Osbourn, of Aldersgate-street, London, tailor. Improvements applicable to the distribution of manure.

2869. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in portable cases for containing provisions. A communication from Alexandre Desiré Eugene Bouchez, of Paris, France, merchant.

2870. Gideon Morley, of Birmingham, Warwick. Ornamenting or producing pictures on japanned goods, panels, canvass, or other material, whereby a vast amount of artistic skill and labour is superseded.

2871. William Schaeffer, of Stanhope-terrace, Middlesex, chemist. Improvements in purifying spirit.

2872. John Bourne, of Port Glasgow, Renfrew, Scotland. Improvements in steam engines.

2873. John Bourne, of Port Glasgow, Renfrew, Scotland. Improvements in machinery for the production of iron ships, and other similar structures.

2874. John Bourne, of Port Glasgow, Renfrew, Scotland. Improvements in the construction of iron ships.

2875. Henry Bessemer, of Baxter House, Old St. Pancras-road, Middlesex, engineer. Improve-

ments in the construction of railway axles and breaks.

Dated December 10, 1853.

2876. Allan Macpherson, of Brussels, Belgium, gentleman. Improvements in disinfecting sewers or other drains or depositaries of fœtid matters or gases, and in converting the contents thereof to useful purposes.

2877. William Muir, of the Britannia Works, Manchester, engineer and machinist. Improvements in machinery and apparatus for cutting out parts of garments.

2878. Charles Coates, of Sunnyside, near Rawtenstall, Lancaster, mechanic. Improvements in and applicable to looms for weaving.

2881. John Henry Johnson, of Lincoln's-inn-fields, Middlesex, gentleman. Improvements in furnaces for the manufacture of steel. A communication.

2882. Edward Green, of Wakefield, York, engineer. Improvements in boilers and furnaces.

2883. Nicolas Victor Guibert, of Paris, France, practical engineer. Improvements in forge-hammers.

2884. William Thornley, of Clayton West, York, manager. An improved manufacture of woven fabrics.

Dated December 12, 1853.

2885. Edward Orange Wildman Whitehouse, of Brighton, Sussex, surgeon. Improvements in effecting telegraphic communications

2886. Thomas Hollinsworth, of Winwick, near Warrington, Lancaster, engineer. Certain improvements in the method of applying breaks to carriages employed upon railways, and in the machinery or apparatus connected therewith.

2887. William Evans, of Myrtle-street, Hoxton, Middlesex. Improvements in obtaining and applying motive power.

Dated December 13, 1853.

2888. William Redgrave, of Croxley-green, Rickmansworth, Hertford. The improved safety travelling-cap.

2889. George Kerr Hannay, author, of Ulverston, Lancashire. The combination and manufacture of composition grinding-wheels, hones, and other grinding bodies.

2890. James Wansbrough, of the Grove, Guildford-street, Southwark, Surrey, waterproofer. Improvements in the manufacture of waterproof fabrics.

2891. William Frederick Plummer, of St. Mary's Overy Wharf, Southwark, mechanist. Improved machinery for grinding or crushing animal, vegetable, and mineral substances.

2892. Christian Schiele, of North Moor Foundry, Oldham, Lancaster, engineer. Improvements in preventing undue oscillation in engines, machinery, carriages, and other apparatus.

2893. André Gaspard Guesdron, of Montmartre, Paris, France, merchant. An improvement in or addition to sugar-basins.

2894. André Gaspard Guesdron, of Montmartre, Paris, France, merchant. A method of producing plans in relievo.

Dated December 14, 1853.

2896. Frederick Albert Gatty, of Accrington, Lancaster, manufacturing chemist, and Emile Kopp, of Accrington aforesaid, professor of chemistry. Improvements in printing and dyeing cotton, wool, silk, and other fibrous substances.

2898. Edward Beanes, of Charlotte-street, Portland-place, Middlesex. Improvements in the manufacture and refining of sugar.

2900. Benjamin Fullwood, of Abbey-street, Bermondsey, Surrey, manufacturing chemist. Certain improvements in the manufacture of cement.

2902. Richard James Norman King, of Exeter, dentist. An improved artificial bait for fish.

2904. William Beckett Johnson, of Manchester, Lancaster, engineer. Improvements in machinery or apparatus for making bricks and other articles from clay and other plastic materials.

NOTICES OF INTENTION TO PROCEED.

(*From the "London Gazette," December 23rd*, 1853.)

1675. George Humphery. Improvements in regulating the supply of water for water closets.

1778. William Wild. Improvements in machinery, or apparatus for covering rollers used in the manufacture of cotton and other textile materials, with leather, cloth, or other substances.

(*From the "London Gazette," December 27th*, 1853.)

1820. William Hickson. Improvements in canal and river navigation, and in vessels to be used in such navigation, and in the mode of propelling the same.

1832. Edward Taylor Bellhouse. Improvements in fireproof structures.

1843. Robert Morrison. Improvements in apparatus for forging, shaping, and crushing iron and other materials, and for driving piles.

1850. Thomas Young Hall. Improvements in combining glass with other materials.

1853. Henry des Moutis. An improved system of publicity.

1895. Frederick Lipscombe. Improvements in evaporating.

1931. David Harkes. Improvements in machinery or apparatus for mowing, reaping, or other similar purposes.

1940. Frederick William Alexander De Fabeck. The construction of viaducts, bridges, lintels, beams, girders, and other horizontal structures and supports.

2049. André Calles. Improvements in manufacturing typographic characters.

2177. Henry Walker. Improvements in the modes or means of stopping or retarding vehicles used on railways,

2197. James Leetch. An improved method of constructing breech-loading fire-arms.

2207. Charles Maitland and William Gorrie. Improvements in apparatus for heating water or other liquids.

2227. Jean Alexandre Labat, junior. An improved system of stoppering vessels and bottles.

2290. Charles Augustus Holm. Improvements in machinery for raising or propelling elastic and non-elastic fluids.

2486. George Edward Dering. Improvements in galvanic batteries.

2563. William Raester. Improvements in the construction and arrangement of the buffing apparatus of railway carriages, and in the mode of applying the buffer and draw-springs to such carriages.

2570. John Banks Nicklin. Improved gelatinous or glutinous compounds for lubricating railway and other machinery.

2612. James Willis. Improvements in buckles.

2615. John Platt. Certain improvements in apparatus or machines for forging, drawing, moulding, or forming spindles, rollers, bolts, and various other articles in metal.

2639. William Smith. Improvements in ruling ornamental figures.

2641. Charles De Bergue. An improvement or improvements in machinery or apparatus for removing patterns from moulds for castings.

2678. Amédée François Rémond. An improve-